

**THEMATIC TOPIC: STRESS TOLERANCE IN AN ERA OF CLIMATE
CHANGE: FROM GENES TO ECOSYSTEMS
TT2.1**

**Surviving Environmental Change on the Antarctic Peninsula: Stress Tolerance in
the Southernmost Insect**

Richard E Lee Jr. (Miami University)

In polar regions tolerance of low moisture conditions is likely as important for terrestrial organisms as cold hardiness. Overwintering larvae of the chironomid midge, *Belgica antarctica*, must endure months of continuous subzero temperatures and encasement within an icy substrate without access to free water. Our recent studies have examined physiological and molecular mechanisms of stress tolerance in this polyextremophilic species.

11:15 Tuesday 18th December 2012

TT2.2

**Metabolic phenotypes explain coastal plant community responses to changing
environmental conditions.**

Rachel M George (University of Sheffield), Robert P Freckleton (University of Sheffield), Michael M Burrell (University of Sheffield), Matthew P Davey (University of Cambridge), Mark K.J Ooi (University of Wollongong)

Plants rely on metabolic networks to cope with changing environmental conditions. This research uses metabolomic techniques that paint a picture of the functional status of a plant, to investigate whether wild populations differ in their ability to adapt to stresses in their natural environment and show plasticity when faced with new climatic conditions.

11:45 Tuesday 18th December 2012

TT2.3

The metabolic phenotype and its role in tolerating a changing climate

Matthew P Davey (Department of Plant Sciences), W. Paul Quick (University of Sheffield), Philippine Vergeer (Radboud University Nijmegen), William E Kunin (University of Leeds), Rachel M George (University of Sheffield), F. Ian Woodward (University of Sheffield)

Plant populations growing at the margin of their range may exhibit traits that indicate genetic adaptation to their local abiotic environment. I investigated the metabolic responses of an arctic-alpine plant species to temperature change in laboratory and field studies. Metabolomic phenotypes associated with temperature stress explain observed distribution patterns across Europe.

12:00 Tuesday 18th December 2012

TT2.4

Between migration load and evolutionary rescue: the response of spatially structured populations to environmental change.

Elizabeth C. Bourne (Freie Universität Berlin Institut für Biologie - Botanik Germany), Greta Bocedi (School of Biological Sciences University of Aberdeen), Robin J. Pakeman (The James Hutton Institute Aberdeen), Rob W. Brooker (The James Hutton Institute Aberdeen), Justin M.J. Travis (School of Biological Sciences University of Aberdeen), Katja Schiffrers (Laboratoire d'Ecologie Alpine University Joseph Fourier CNRS Grenoble)

The capacity of populations to respond to rapid environmental change will be determined by a number of genetic and demographic factors. We use allelic simulation models to show that, while dispersal between populations facilitates adaptation to climate via the spread of beneficial alleles, local selection may apply costs to dispersal, reducing overall evolutionary potential.

12:15 Tuesday 18th December 2012

TT2.5

Winter climate change: elevated adult temperature results in cross generational loss of cold tolerance

Paul C Coleman (Birmingham), Scott AL Hayward (Birmingham), Jeffery S Bale (Birmingham)

Virtually all temperate insects utilise diapause as their overwintering strategy. Associated with diapause is an increased cold tolerance ability. Climate change threatens to expose adults to warmer late-autumn temperatures, while diapausing larval progeny will still experience periods of severe mid-winter cold. Experimental evidence indicates the result of this will be a cross-generational loss of cold tolerance mechanisms.

12:30 Tuesday 18th December 2012

TT2.6

Do increasing water shortages generate greater water stress? A key issue to understand plant ecosystem functioning along resource availability gradients

BARKAOUI Karim (CNRS Centre d'Ecologie Fonctionnelle et Evolutive), VOLAIRE Florence (INRA Centre d'Ecologie Fonctionnelle et Evolutive (UMR 5175)), NAVAS Marie-Laure (Montpellier SupAgro Centre d'Ecologie Fonctionnelle et Evolutive (UMR 5175))

Standardized quantification of gradients in water availability is a fundamental prerequisite for accurately interpreting the patterns of plant community functional structure under

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climate change. We identified relevant metrics to unravel the effects of contrasting soil water resource and plant response on ecosystem processes such as biomass productivity in Mediterranean grasslands.

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TT2.7

Ecophysiological performance of an invading insect in Antarctica

Peter Convey (British Antarctic Survey), Kevin A Hughes (British Antarctic Survey), M. Roger Worland (British Antarctic Survey), Michael A.S. Thorne (British Antarctic Survey)

The risk of biological invasions is increasing in Antarctica. Studies of a detritivorous chironomid midge introduced accidentally in the 1960s highlight some of these risks. Where the midge occurs, it may be responsible for as much breakdown as the entire native soil faunal community, while its ecophysiological tolerances suggest it has the potential to spread widely along the Antarctic Peninsula.

15:00 Tuesday 18th December 2012

TT2.8

Woody encroachment on savanna landscapes: How have tree population communities changed over time in relation to fire regimes and increasing atmospheric CO₂ ?

Aisling Devine (University of Exeter), Ilya Maclean (University of Exeter)

Extensive woody encroachment has occurred in savannas, but drivers of this are uncertain. To determine the relative importance of fire and CO₂ enrichment, we examined changes (1954-2012) in woody biomass in plots subjected to various frequencies of controlled burning. We show that woody biomass is lower in frequently burnt plots, but the relative impact of burning has changed through time.

15:30 Tuesday 18th December 2012

TT2.9

Which traits are correlated with high drought mortality in trees? A case study from the Edwards Plateau, Texas, USA

Susanne Schwinning (Texas State University), Kelly Kukowski (Texas State University), Benjamin Schwartz (Texas State University)

The 2011 Texas Drought killed approximately 10% of the state's trees. At our study site, mortality rates for four tree species varied between 1% and 34% and, excluding one conifer, were positively correlated with wood density and with rates of sap flow decline at the onset of drought conditions. We discuss implications for mechanisms of drought mortality in trees.

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TT2.10

Evolution of stress tolerance – what can we learn from studies in the laboratory?

Peter Lund (University of Birmingham)

The ability to sequence genomes cheaply and quickly has led to a rapid increase in studies using “lab-based evolution”. These involve evolving a population (usually bacterial) over time to become more tolerant of a stress, selecting clones with altered phenotypes, resequencing their genomes and identifying the mutation(s) responsible. I will review some recent studies in field, including our own.

16:00 Tuesday 18th December 2012

THEMATIC TOPIC: BIODIVERSITY AND THE PROMOTION OF GOOD HEALTH AND WELLBEING

TT4.1

Biodiversity, cultural values and human health

Ken Norris (University of Reading), Natalie Clark (University of Reading), Rebecca Lovell (ECEHH), Sahran Higgins (ECEHH)

Biodiversity is culturally important, but we have little idea how biodiversity loss affects health through these cultural pathways. Human health is sensitive to apparently trivial psychological stimuli, negatively affected by the risk of environmental degradation, and positively affected by contact with natural spaces. This suggests health should be affected by biodiversity change, but few studies have explored these relationships.

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TT4.2

Are functional ecosystems and Biodiverse environments important for population health and wellbeing?

Dave Stone (Natural England)

There is a growing evidence-base that healthy accessible environments support individual physical and mental health in urban society. The majority of evidence points towards these effects arising from individual direct contact and use of nature: environmental utility. This paper explores whether health and wellbeing of predominantly urban populations is incidentally effected by a healthy natural environment.

11:45 Tuesday 18th December 2012

TT4.3

Systematic review of evidence linking biodiverse environments to better health and wellbeing

Rebecca Lovell (ECEHH University of Exeter Medical School), Ben Wheeler (ECEHH University of Exeter Medical School), Sahran Higgins (ECEHH University of Exeter Medical School), Katherine Irvine (Institute of Energy and Sustainable Development De Montfort University), Michael Depledge (ECEHH University of Exeter Medical School)

Both health and conservation sciences have called for greater clarity regarding the role of the environment in determining human health and wellbeing. We systematically identified and examined existing evidence linking biodiversity to good health. While the body of evidence indicates a positive relationship, strength and direction of relationships is uncertain.

12:00 Tuesday 18th December 2012

TT4.4

Links between biodiversity and human health and well-being in urban greenspace: multiple measures of value, motivation and benefit.

Martin Dallimer (University of Copenhagen), Katherine N Irvine (De Montfort University), Zoe G Davies (University of Kent), Dugald Tinch (University of Stirling), Sara Warber (University of Michigan), Lorraine Maltby (University of Sheffield), James Rouquette (University of Sheffield), Kevin J Gaston (University of Exeter), Philip Warren (University of Sheffield), Nick Hanley (University of Stirling), Paul R Armsworth (University of Tennessee)

Today's mostly urban society is becoming increasingly disconnected from nature. This comes at a time when a growing body of evidence suggesting that interactions with the natural environment are important for human health and wellbeing. We use multiple measures of preference, value, motivation and benefit to quantify what role biodiversity may play in ameliorating the urban experience for city dwellers.

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TT4.5

Environmental quality and variation mental health in rural England

Sahran L Higgins (University of Exeter Medical School), Benedict W Wheeler (University of Exeter Medical School), Rebecca Lovell (University of Exeter Medical School), Michael H Depledge (University of Exeter Medical School)

Data from the RELU SEIRA and SECRA projects for 6,027 Lower-layer Super Output Areas (LSOAs) were analysed to assess relationships between indicators of environmental

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quality and variation in population mental health. Populations living in LSOAs with greater bat species richness had better mental health, which persisted after adjustment for other ecological and socio-economic factors.

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TT4.6

Assessing the impact of biodiversity on well-being: can birds make us happy?

Natalie E Clark (University of Reading), Ken Norris (University of Reading), Simon Butler (University of East Anglia), Richard Bradbury (RSPB), Robert Metcalfe (University of Chicago)

It is widely acknowledged that biodiversity is culturally important but we have little idea of the effects that ecological population change may have upon our health. Using postal surveys, we explore this relationship by assessing the effect of wild birds on people's subjective well-being in various sites across the UK.

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TT4.7

Human Well-being Impacts of Terrestrial Protected Areas: A Systematic Review

Neal R Haddaway (Centre for Evidence-Based Conservation), Andrew S Pullin (Centre for Evidence-Based Conservation), Mukdarut Bangpan (Evidence-informed Policy and Practice Information and Coordinating Centre), Sarah Dalrymple (Centre for Evidence-Based Conservation), Kelly Dickson (Evidence-informed Policy and Practice Information and Coordinating Centre), Hanan Hauari (Evidence-informed Policy and Practice Information and Coordinating Centre), John R Healey (Bangor University), Neal Hockley (Bangor University), Julia P G Jones (Bangor University), Teri Knight (Centre for Evidence-Based Conservation), Carol Vigurs (Evidence-informed Policy and Practice Information and Coordinating Centre), Sandy Oliver (Evidence-informed Policy and Practice Information and Coordinating Centre)

Protected Areas constitute a major conservation intervention but there is policy concern over their impact on local human populations. We describe a systematic review of evidence on the impacts of protected areas on human wellbeing. The resulting evidence base is presented in terms of its implications for policy and future research.

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TT4.8

The aesthetics of biodiversity: how do they contribute to human health and wellbeing?

Anna Jorgensen (Department of Landscape the University of Sheffield), Georgina Southon (Department of Landscape the University of Sheffield)

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Landscape aesthetics are cultural ecosystem services contributing to human wellbeing; but are poorly theorized in inter-disciplinary research, and little is known about the aesthetic apprehension of biodiversity or its effects. This paper will review the evidence and differentiate the functions of the aesthetics of biodiversity in mental health and wellbeing.

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TT4.9

Is biodiversity a driver in the health benefits of green-blue space?

Jenny J Roe (Heriot Watt University)

Evidence illustrating the beneficial impact of natural settings on health is widely documented. However little is known about the impact of the quality of landscape and its biodiversity value. This paper posits that biodiversity can offer objective quality evaluations of differing landscapes to build further understanding of 'green health'; it also points to some of the potential problems with this.

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TT4.10

Biodiversity conservation in public health or public health in biodiversity conservation? The diffusion of research evidence

Konstantinos Tzoulas (Manchester Metropolitan University)

Citation analyses of published evidence in the field of biodiversity and human health were undertaken. In the last forty years 173 articles have been published in 104 different journals. The range of disciplines includes health, psychology, architecture, forestry and ecology. The results indicate that knowledge is diffusing between the disciplines.

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THEMATIC TOPIC: THE ECOLOGY AND EVOLUTION OF MICROBIOMES

TT5.1

Unrest at home: Stability and Resilience in the Human Microbiome

David A. Relman (Stanford University)

My laboratory group studies stability and resilience in the human oral and distal gut microbial communities using longitudinal sampling schemes, deliberate disturbance in human volunteers, molecular assessments of community structure and function, and

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ecological theory and statistics. Our goal is to understand and predict community robustness in the face of disturbance in order to improve health and disease.

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TT5.2

Evolutionary ecology of cystic fibrosis lung infections

Michael Brockhurst (University of York), Craig Winstanley (University of Liverpool), Steve Paterson (University of Liverpool), Ben Evans (University of Liverpool), Chloe James (University of Liverpool)

Pseudomonas aeruginosa is the predominant pathogen infecting the lungs of cystic fibrosis patients. Since 2009 we have tracked the phenotypic and genetic diversity of *P. aeruginosa* populations infecting 10 cystic fibrosis patients. Our analysis demonstrates that these populations have evolved high levels of diversity and that this diversity is very dynamic with turnover of dominant phenotypes over short intervals.

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TT5.3

Causes and possible consequences of variation in the gut bacterial community of a UK bird population

Kenneth Wilson (Lancaster University), Clare Benskin (Lancaster University), Ian Hartley (Lancaster University), Roger Pickup (Lancaster University), Glenn Rhodes (NERC - CEH Lancaster), Rachel Hope (Lancaster University)

There is a growing understanding of the causes and consequences of variation in the community of microorganisms living in the human gut, but much less is known about the microbiomes of wild animals. Here we present initial findings from a molecular analysis of spatio-temporal variation in the gut bacterial community of a population of blue tits and its possible fitness consequences.

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TT5.4

Biogeography, season and parasites are linked to the wild mouse gut microbiota

Amy B Pedersen (University of Edinburgh), Corinne F Maurics (Harvard University), Sarah CL Knowles (Imperial College), Andy Fenton (University of Liverpool), Peter J Turnbaugh (Harvard University)

The trillions of microorganisms found with the mammalian gastrointestinal tract, the gut microbiota, are shaped by many environmental factors. Studies of inbred laboratory mice have emphasized the importance of biogeography, diet, and infectious disease. Here, we survey the gut microbiota of wild wood mice for two consecutive years, demonstrating that

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these factors are also relevant to wild mouse populations.

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TT5.5

Microbial community ecology of cystic fibrosis respiratory infections: Ecological insights for clinical benefit

Christopher J Van der Gast (NERC Centre for Ecology and Hydrology)

Our overarching aim is to exploit and adapt ecological models, theories, and principles, coupled with ever improving molecular methodologies to move beyond basic inventory descriptions of composition and diversity of CF microbial communities. This will allow us to better understand and predict how microbial communities assemble and develop in the CF lung, and how microorganisms are distributed between- and within-patients.

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ABOVE GROUND - BELOW GROUND INTERACTIONS

01.1

Plant traits explain landscape-scale variation in soil microbial communities

Franciska T De Vries (Lancaster University), Pete Manning (University of Newcastle), Richard D Bardgett (Lancaster University)

Most evidence for links between plant traits and soil microbial communities comes from small-scale studies. We found that across 180 English grasslands, plant traits explained a significant amount of variation in soil microbial community composition, and specifically, that plant traits associated with conservative growth strategies were linked to fungal-dominated microbial communities.

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01.2

Understorey vegetation and soil carbon process: Insights from subtropical plantations and orchard systems

Zhanfeng Liu (South China Botanical Garden Chinese Academy of Sciences), Jianping Wu (Institute of Ecology Environmental Sciences65292Nanchang Institute of Technology), Shenglei Fu (South China Botanical Garden Chinese Academy of Sciences)

Manipulative experiments in subtropical plantation and orchard systems showed that understorey vegetation plays an important role in driving the ecological processes and functions of Eucalyptus plantations, such as soil respiration, litter decomposition and soil microbial community composition. Maintaining a living understorey vegetation has great soil

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carbon sequestration potential in subtropical orchard systems.

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01.3

Peatland green house gas emissions from a peatland windfarm

Nick Ostle (NERC Centre for Ecology and Hydrology), Alona Armstrong (University of Glasgow), Jeanette Whitaker (NERC Centre for Ecology and Hydrology), Susan Waldron (University of Glasgow)

Wind farms affect the local climate as they remove energy and increase turbulence. Given that both gas fluxes and dissolved organic carbon concentrations are significantly controlled by temperature and water table depth, a wind turbine – induced microclimate may significantly affect the carbon budgets of peatlands. In this paper we present data from Black Law Windfarm, Scotland.

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01.4

Contrasting functional traits drive leaf, twig and wood decomposition in New Zealand's temperate rainforests.

Benjamin G. Jackson (Swedish Univ. of Agr. Sci.), Duane Peltzer (Landcare Research), David A. Wardle (Swedish Univ. of Agr. Sci.)

We compared the functional traits of green leaves and leaf, twig and wood litters among 27 co-occurring tree species, and quantified the decomposability of the three litter types. We tested for coordination in the relative litter quality and decomposition across the three litter types, and identified the functional traits most closely associated with the decomposition of leaves, twigs and wood.

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01.5

Development of cabbage root flies on genetically different populations of wild cabbage

Moniek Van Geem (Netherlands Institute of Ecology), Jeffrey A Harvey (Netherlands Institute of Ecology), Rieta Gols (Wageningen University)

Previous studies have reported significant differences in the performance of above-ground herbivores and parasitoids on different populations of wild cabbage growing along the Dorset (UK) coast. Here, we find only subtle effects of plant-related differences in quality on a root herbivore. Potential interactions between root and shoot herbivores in this system are explored.

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01.6

Everyone's a winner! Feeding facilitation between above- and belowground herbivores.

Scott W McKenzie (Centre for Ecology and Hydrology), Adam J Vanbergen (Centre for Ecology and Hydrology), Hefin T Jones (Cardiff University), Rosie S Hails (Centre for Ecology and Hydrology), Scott N Johnson (University of Western Sydney)

Positive bi-directional feeding facilitation, where both herbivores benefit by each other's presence, is rare. Here we present evidence for this phenomena between a herbivore feeding aboveground (an aphid) and belowground (vine weevil larvae). Although spatially separated, these herbivores interact via changes in plant chemistry. We show this can prove beneficial to both insects at the expense of the plant.

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01.7

Contrasting effects of different nitrogen addition levels on soil respiration in a Boreal forest.

Daniel Metcalfe (Swedish University of Agricultural Sciences), Niles Hasselquist (Swedish University of Agricultural Sciences), Peter Högborg (Swedish University of Agricultural Sciences)

Increased nitrogen availability is believed to suppress decomposition and hence promote ecosystem carbon sequestration, but this largely stems from studies applying nitrogen at rates orders of magnitude higher than current or likely future ambient nitrogen deposition. We show that this assumption may be flawed by demonstrating opposing responses of soil respiration to different nitrogen levels in a subarctic pine forest.

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01.8

Intraspecific variation in plant defense affects interactions between aboveground and belowground herbivores of *Plantago lanceolata*

Jinghua Huang (Netherlands Institute of Ecology), Martijn Bezemer (Netherlands Institute of Ecology), Arjen Biere (Netherlands Institute of Ecology), Wim H. Van der Putten (Netherlands Institute of Ecology)

The plant-mediated interactions between aboveground and belowground herbivores have attracted more and more attention. Our research mainly focus on interactions between aboveground and belowground herbivores of *Plantago lanceolata*. A greenhouse experiment was conducted to investigate how genetic variation in plant defense between *P.lanceolata* lines affects performance of aboveground herbivores, belowground

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nematodes and their interactions, via influencing defense compounds in plant.
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01.9

Linking aboveground and belowground plant traits to microbial communities in grasslands

Catherine L Baxendale (Lancaster University), Richard D Bardgett (Lancaster University)

Plant traits can influence the soil microbial community through their influence on the quantity and quality of organic carbon inputs to soil. We present results from cross site mesocosm and field experiments aimed at identifying how plant traits, both aboveground and belowground, impact on microbial communities of grassland soil.

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01.10

Livestock grazing impacts aboveground but not belowground carbon stocks on salt marshes

Rachel J Kingham (School of Ocean Sciences Bangor University), Martin Skov (School of Ocean Sciences Bangor University), Angus Garbutt (Centre of Ecology and Hydrology), Steve Hawkins (Ocean and Earth Science National Oceanography Centre Southampton University)

Ecosystem management can impact soil carbon stocks, but threshold levels are rarely known and in highly variable systems, threshold levels can alter. A survey of twenty-two salt marshes showed grazing effects on aboveground plant properties, but no effect on belowground carbon stocks. The study demonstrates grazing has a weak broad-scale effect on carbon storing in comparison to environmental variation.

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01.11

Negative plant-soil feedback strikes in species rich plant communities, to the benefit of 'neutral' species

Roeland Cortois (Netherlands institute of Ecology), Gerlinde B De Deyn (Netherlands institute of Ecology), Wim H Van der Putten (Netherlands institute of Ecology)

Negative plant-soil feedback (PSF) plants are expected to grow better in diverse plant communities relative to monocultures, potentially driving positive biodiversity-productivity relationships observed in biodiversity experiments. However, negative PSF species also tend to remain subordinate in plant communities. We find the latter aspect to be deciding: 'neutral' PSF species dominate productivity while outcompeting negative PSF plants in diverse plant communities.

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01.12

Nutrient cycling and decomposition processes in invaded, riparian plant communities

Lindsay Banin (University of Ulster), Dario Fornara (University of Ulster), Valeria Cenini (University of Ulster), Eleonora Fitos (University of Ulster), Christine Maggs (Queens University Belfast)

Biotic exchange, and the spread of invasive plant species, has been identified as a major agent of biodiversity loss and environmental change. Some invasives also alter key ecosystem processes such as nitrogen cycling. Focussing on three problematic invasive species in Ireland, we compare nutrient cycling and decomposition processes in invaded and native communities.

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01.13

What are the mechanisms controlling carbon flux from peat soils across the hillslope?

Ian M Boothroyd (Durham University), Fred Worrall (Durham University), Tim Allott (University of Manchester)

This talk shall present results from the Peak District, United Kingdom, looking into the role that soil organic matter quality may have in constraining the explanations of changes in carbon flux across the hillslope. One metre soil cores were analysed for CHNO content, energy content and thermal weight loss; indicating significant changes in organic matter quality across the hillslope.

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01.14

Trade-offs and scaling of functional traits in *Sphagnum* as drivers of carbon cycling in peatlands

Chris Laing (Queen Mary University of London)

We measured *Sphagnum* traits across a range of species and habitats, and examined scaling of traits with canopy variables. Two trait trade-offs emerged. Individual metabolic rate and capitulum size decreased with height above water table, whereas photosynthetic efficiency decreased from treed to open habitats. Rates of production, height growth and litter decomposition scaled with *Sphagnum* traits.

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AGRICULTURAL ECOLOGY

02.1

Assessing the evidence behind reform of the Common Agricultural Policy

Lynn V Dicks (University of Cambridge), William J Sutherland (University of Cambridge)

We have systematically collated and assessed ecological evidence on the effects of interventions to benefit wildlife on farmland. We illustrate how this process can inform policy using the proposed restructuring of the European Union's Common Agricultural Policy. We demonstrate that the greening proposals are not very well supported by empirical ecological evidence.

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02.2

Climate change and farmland ecosystem services: Impacts of experimental warming and increased precipitation on plant-insect-parasitoid foodwebs

Stephane A.P. Derocles (Department of Biological Sciences University of Hull), David H. Lunt (Department of Biological Sciences University of Hull), Jonathan Atkins (Hull University Business School University of Hull), Guy Hembury (Centre for Adaptive Science Sustainability University of Hull), Darren M. Evans (Department of Biological Sciences University of Hull)

We investigate the ecological and economic costs of simulated climate change on a farmland ecosystem. With a focus on wheat yields, we use a fully-replicated experiment to increase temperature by 2 °C and precipitation by 20%. We use a molecular approach to determine the impact of the treatments on the ecological network of plants, aphids, leaf-miners and associated parasitoids.

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02.3

Does the conversion of agricultural land to Short Rotation Coppice Willow (SRCW) benefit Irish overwintering and breeding birds?

Nick Hesford (Queen's University Belfast), Konstantinos V Vlachopoulos (University of the Aegean), Sarah M McCaffrey (Queen's University Belfast), Damian Magill (Queen's University Belfast), Alison Cameron (Queen's University Belfast)

Point count surveys were conducted in winter and spring in grass pasture, short rotation coppice willow, forest, and interface habitats such as hedgerows, on 10 farms. Species richness and diversity indices indicate that this new woody habitat provides useful cover

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for birds during both seasons. Multivariate community analysis indicates that the SRCW bird community is a relatively unique assemblage.

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02.4

Ecology of bats in short rotation willow coppice: a win-win situation?

Ian Montgomery (Queen's University Belfast), Sylwia Kowalcze-Magiera (Queen's University Belfast), Alison Cameron (Queen's University Belfast), Mat Lundy (Queen's University Belfast)

Biomass crops are becoming a significant feature of our landscape. Short rotation willow plantations have local benefits for biodiversity and global benefits in reducing fossil carbon emissions. We report the impact of willow planted in a predominantly pastoral landscape on four bat species. Retention of hedges on field boundaries helps increase bat foraging along willow edge.

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02.5

Economic and environmental performance of coffee farms with different sustainability certifications in Nicaragua

Jeremy P Haggard (University of Greenwich), Gabriela Soto (CATIE)

Coffee certification aims to channel economic incentives from consumers to farms that meet social and environmental standards. Nearly 300 coffee farms were surveyed in Nicaragua from 5 different certifications plus conventional. Economic (net income) and environmental (shade tree diversity, soil and water conservation) performance differed between farms under distinct certifications, but was also influenced by farm size.

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02.6

Is the Higher Level Stewardship agri-environment scheme delivering for farmland bird species in England?

Jenny Bright (RSPB), Tony Morris (RSPB)

Population trends were compared on 86 HLS and control farms between 2008 and 2011 for birds of conservation concern. Populations increased on HLS farms, but declined or remained stable on control farms, for grey partridge, tree sparrow, house sparrow, reed bunting and yellowhammer. This provides some of the strongest evidence to date of agri-environment benefits for widespread but declining species.

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02.7

Intensification, abandonment, or both? Impacts of agricultural change following EU accession on farmland birds in Poland

Fiona J Sanderson (RSPB), Marta Kucharz (OTOP (Polish Society for the Protection of Birds)), Marek Jobda (OTOP (Polish Society for the Protection of Birds)), Paul F Donald (RSPB)

Western Europe's farmland bird populations have severely declined as a result of agricultural management changes driven by the European Union's Common Agricultural Policy. We examined changes in farmland bird abundance across Poland after EU accession in relation to changes in agricultural management to assess how joining the EU has affected Poland's farmland and its internationally important populations of farmland birds.

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02.8

Landscape-scale responses of birds to agri-environment management: a test of the English Environmental Stewardship scheme

David J. Baker (Durham University), Stephen N. Freeman (Centre for Ecology Hydrology), Phil V. Grice (Natural England), Gavin M. Siriwardena (British Trust for Ornithology)

Agri-environment schemes are used across Europe to address biodiversity declines in farmland. We assessed the efficacy of Environmental Stewardship in driving changes in farmland bird populations, finding evidence for positive effects of management that provides winter food resources, but the effects of management aimed at breeding season resources were mixed.

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02.9

Role of crop protection chemicals ('pesticides') in delivering sustainable agriculture and feeding a growing population

Steve M Norman (Dow AgroSciences)

Benefits from pesticides are poorly understood by the public. Pesticides have become demonised by the legacy of organochlorine insecticides. Herbicide use in wheat doubles yield. Pest control on apples with chemicals is mainstay to high quality affordable fruit which society expects. The pesticides debate should be holistic, considering risks and benefits, in context of habitat management such as creation of field margins.

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02.10

The biodiversity of Short Rotation Coppice Willow (SRCW): implications of land conversion, harvest cycles, and hedgerow management.

Alison Cameron (Queen's University Belfast), Nick Hesford (Queen's University Belfast), Sylwia Kowalcze-Magiera (Queen's University Belfast), Mathieu Lundy (Queen's University Belfast), Damian Magill (Queen's University Belfast), Sarah M McCaffrey (Queen's University Belfast), W I Montgomery (Queen's University Belfast), Siobhan Porter (Queen's University Belfast), Konstantinos V Vlachopoulos (University of the Aegean)

Biofuel crops are increasingly competing with food crops for space in our agricultural landscape. Quantitative surveys of birds, bats, small mammals, and insects were conducted in grass pasture, three ages of willow, hedge rows and forest, as well as along a range of linear interfaces. Results from multivariate community analysis for each group are compared and discussed.

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02.11

Using plant functional traits to map ecosystem service delivery in arable systems.

Jonathan Storkey (Rothamsted Research)

With increasing pressure on arable land for food production, it is important to optimise management for biodiversity and delivery of ecosystem services to minimise the amount of land that needs to be taken out of production. Statistical models quantifying the relationships between plant functional traits and ecosystem services can allow multiple services to be traded-off.

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02.12

Open Farm Sunday Pollinator Survey: Engaging people in recording insects on farms

Helen E Roy (NERC Centre for Ecology and Hydrology), Lucy Cornwell (University of Leeds), Mike Edwards (Edwards Ecological Services Ltd), Caroline Cowan (Edwards Ecological Services Ltd), Sue Edwards (Edwards Ecological Services Ltd), Matt Heard (NERC Centre for Ecology and Hydrology), James Moreton (Syngenta), Annabel Shackleton (LEAF), Michael Pocock (NERC Centre for Ecology and Hydrology)

Declines in insect pollinators have been widely documented. We describe a mass participation initiative to assess numbers of insects visiting flowers in crop and non-crop habitats on farms involved in Linking Environment and Farming (LEAF) Open Farm Sunday (OFS) - an annual event attended by over 150000 people. OFS Pollinator Survey increases participation in biological recording and produces valuable data.

15:45 Tuesday 18th December 2012

COMMUNITY ECOLOGY

08.1

Direct interspecific interactions and not indirect intraspecific interactions explain invasion success of invertebrate predators

Tom C Cameron (Umeå University), Hanna Ten Brink (Umeå University), Andre De Roos (University of Amsterdam), Lennart Persson (Umeå University)

We present an analysis of stage-structured model, long term lake data and experimental mesocosms to explain the causes and consequences of invasion success of an aquatic invertebrate predator, *Bythotrephes longspinus*, in its native range. *B. longspinus* has a strong effect on zooplankton, but its invasion success appears to be dependent on differences in the size distribution of resident fish populations.

11:15 Tuesday 18th December 2012

08.2

Functional species pool framework to disentangle biotic and abiotic effects on community assembly

Francesco De Bello (Institute of Botany Czech Academy of Sciences), Jodi N Price (Institute of Ecology and Earth Sciences University of Tartu), Jan Leps (Department of Botany Faculty of Science University of South Bohemia), Meelis Partel (Institute of Ecology and Earth Sciences University of Tartu)

Functional diversity is increasingly used to infer the effects of biotic and abiotic processes on species coexistence. To disentangle these effects we propose an operational framework in which the *trait dissimilarity within communities* is compared to the corresponding trait dissimilarity in the species pool (i.e. *functional trait pool diversity*). Both simulated and field data were analyzed to illustrate the framework.

11:30 Tuesday 18th December 2012

08.3

The role main habitats play in shaping lowland understorey butterfly communities in Papua New Guinea

Legi Sam (Griffith School of Environment Griffith University Australia), Vojtech Novotny (Department of Ecology and Conservation Biology University of South Bohemia Czech

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Republic)

A survey of butterfly communities in open areas, secondary forests, primary forests, and riverine habitats used timed-transect-walks, to quantify differences in species richness and community composition to better understand the environmental variables shaping butterfly communities in different habitats. The study also provided information on habitat preferences of conservationally important endemic butterfly species.

11:45 Tuesday 18th December 2012

08.4

454 pyrosequencing reveals community structure of endorhizosphere and bulk soil archaeal communities in peat mesocosms

Thorunn Helgason (University of York), Sylvia Toet (University of York), Phil Ineson (University of York), Mike R Ashmore (University of York)

Next generation sequencing has transformed our ability to sample microbial community structure. Mesocosms taken from a lowland raised bog were sampled, and the diversity of archaea determined using 16S 454 amplicon diversity screening. Community analysis of bulk soil and endorhizosphere community structure reveals striking differences, the significance of which will be discussed.

12:00 Tuesday 18th December 2012

08.5

Alpha and beta diversity of birds along a complete rainforest altitudinal gradient in Papua New Guinea

Katerina Tvardikova (Institute of Entomology Biology Centre CR Faculty of Science University of South Bohemia CR), Vojtech Novotny (Institute of Entomology Biology Centre AS CR Faculty of Science University of South Bohemia CR)

We bring robust quantitative data on bird communities along a complete (200-3700m asl.) rainforest altitudinal gradient, which is unique for its undisturbed forest. Data were collected during three independent surveys within two years. Birds displayed high diversity at low elevations, and monotonous, approximately linear, decrease in alpha diversity with increasing elevation. The highest species turnover was recorded in mid-elevations.

12:15 Tuesday 18th December 2012

08.6

Analysis of spatial niche utilisation in intertidal fishes: null models based on mesocosm experiment

Seiji Arakaki (AMBL Kyushu Univ. Japan), Mutsunori Tokeshi (AMBL Kyushu Univ. Japan)

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Habitat-wide spatial utilisation was investigated in coexisting gobies through a mesocosm experiment that mimicked the intertidal environment with inter-connected tidepools. Gobies showed variable patterns of space use and growth, which also depended on paired species. Null models derived from the experimental data were effective in assessing the intra- and inter-specific interactions in these species.

12:30 Tuesday 18th December 2012

08.7

Assembly history, environmental change or both: What influences community composition?

Christopher F Clements (The University of Sheffield), Owen L Petchey (University of Zurich), Ben Collen (Zoological Society of London), Tim M Blackburn (Zoological Society of London), Philip H Warren (The University of Sheffield)

Environmental change has the potential to interact with stochastic determinants of community composition, such as assembly order. We investigate the interaction between temperature change and assembly order in model and experimental systems, and find that whilst assembly order does affect community composition, this effect is species-specific and ephemeral, and long-term community composition is driven almost exclusively by temperature.

12:45 Tuesday 18th December 2012

08.8

Can we avoid the 'curse of the Latin binomial' by using a trait-based approach to construct mutualistic networks?

Thomas C Ings (Anglia Ruskin University)

Individual body size has been shown to play a major role in determining food web structure. In this study, I examine the importance of individual traits, including behaviour and body size, in mutualistic networks. I compare the structure of bee-flower networks where nodes represent either trait sets or species identity.

13:00 Tuesday 18th December 2012

08.9

Community interactions drive mosquito-borne disease risk in a UK wetland

Nick Golding (University of Oxford Centre for Ecology & Hydrology)

Mosquito-borne disease risk is often dependent upon the presence of communities of suitable vectors. Using a novel Bayesian statistical model we identify key inter-species interactions which drive assembly of a community of West Nile virus vector mosquitoes in a UK wetland. Such knowledge is crucial to understand the effects of environmental

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change on the risk of mosquito-borne disease.

15:00 Tuesday 18th December 2012

08.10

Consequences for animals of ENSO-induced variations in fruiting phenology: a case study from an Amazon forest (2001-2011)

Pierre-Michel Forget (Muséum National d'Histoire Naturelle), Irene Mendoza (UNESP), Adeline Caubère (MNHN), Patrick Chatelet (CNRS), Isabelle Hardy (MNHN)

This study aimed at understanding whether climate affects reproduction of rainforests. We analyzed fruit availability at Nouragues National Reserve (French Guiana) in 2001-2011. Cross-correlations among ENSO indices and the fruit biomass and diversity showed that three El Niño events were followed by an increase of the overall fruit biomass at the community level.

15:15 Tuesday 18th December 2012

08.11

Differences in ecomorphology and microhabitat use of four saproxylic larvae (Diptera, Syrphidae) in Scots pine stump rot holes

Ellen L Rotheray (University of Stirling)

Co-existence and microhabitat partitioning was explored in larvae of the endangered pine hoverfly *Blera fallax* and three more common species, which occupy rot holes in Scots Pine in Scotland, UK. Each species inhabited a distinct depth in the rot hole and exhibited correspondingly different behaviours. Findings suggest that competitive exclusion will not hamper conservation management efforts for *B. fallax*.

15:30 Tuesday 18th December 2012

08.12

Does size matter? Vegetation quantity and quality responses to the exclusion of herbivore guilds from large ungulates to invertebrates

Alan G Haynes (WSL), Martin Schütz (WSL), Deborah S Page-Dumroese (USDA Forest Service), Anita C Risch (WSL)

Although diverse herbivore communities utilise grasslands, many previous studies only exclude largest animals. Thus, little is known about how smaller herbivores, including invertebrates, affect grassland processes. We find that sequentially excluding different sized herbivores strongly impacts vegetation quantity/quality; depending on original grassland grazing pressures. This has implications for ecosystem nutrient cycling (e.g. C storage) and pattern reinforcing feedbacks.

15:45 Tuesday 18th December 2012

08.13

Dynamics of coral reef composition

Jennifer K Cooper (The University of Liverpool), Matthew Spencer (The University of Liverpool), John Bruno (The University of North Carolina)

Establishing how coral reefs may respond to environmental change is extremely important. We describe statistical models for the short-term dynamics of reef composition, fitted to large data sets from the Caribbean and Great Barrier Reef. We then study the long-term dynamics of these models under a range of environmental scenarios.

16:00 Tuesday 18th December 2012

08.14

Effects of human and natural disturbance on phylogenetic community structure of the seedling layer in a subtropical forest

Liza S Comita (The Ohio State University), Maria Uriarte (Columbia University), Nathan G Swenson (Michigan State University), W. John Kress (Smithsonian Institution), David L Erickson (Smithsonian Institution), Jill Thompson (Centre for Ecology and Hydrology), Jimena Forero-Montaña (University of Puerto Rico), Jess K Zimmerman (University of Puerto Rico)

Disturbance plays a key role in shaping species composition and may also alter the phylogenetic structure of communities. We used a community phylogeny coupled with long-term forest dynamics data to examine seedling phylogenetic community structure following a major hurricane, as well as differences between areas with differing land use histories.

16:15 Tuesday 18th December 2012

08.15

Effects of mowing, fertilization and dominant removal in wet oligotrophic grassland

Jan Leps (University of South Bohemia Ceske Budejovice Czech Republic)

Both mowing and dominant (*Molinia caerulea*) removal have positive and fertilization negative effect on species richness; the changes are scale dependent, species richness decreases faster at small scale. The competitive exclusion is a slow process. The loss of species still continues 15 years after the start of experiment. The removed dominant was partially replaced with functionally dissimilar species.

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08.16

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Leafing, Fruiting and Flowering phenology within the Doi Suthep-Pui National Park in Northern Thailand- Implications for a forest restoration project.

Hannah Betts (University of Liverpool)

Consideration of the links between the phenology, functional traits, performance and ecological strategies of 500 species of tree within an Evergreen Hill Forest in Northern Thailand with particular reference to the selection of suitable species for a forest restoration programme. The value of phenological data in both predicting species performance and the creation of a functioning ecosystem.

16:45 Tuesday 18th December 2012

08.17

Do niche-structured plant communities exhibit phylogenetic conservatism? A test case in an endemic clade

Silvertown Jonathan (The Open University), Yoseph N Araya (The Open University)

We tested for phylogenetic niche conservatism (PNC) in community assembly in African Restionaceae that are endemic to the Western Cape. Significant niche segregation occurred on soil moisture gradients in 7 of 10 communities sampled, but PNC was detectable in only one. Phylogenetic analysis suggested that tolerance of drought is evolutionarily convergent rather than conserved.

09:00 Thursday 20th December 2012

08.18

Life in the harsh post-glacial environment: beetle communities in Glacier Bay, Alaska

Leonie R Clitherow (University of Birmingham), Alexander Milner (University of Birmingham)

There is a lack of understanding of the ecological responses to glacial recession; especially that of terrestrial invertebrates. In Glacier Bay, Alaska, carabid beetle communities were studied, along with a range of habitat variables. Carabid beetles do not show the same successional patterns as other taxa and have weak associations with habitat variables, unlike those in more temperate environments.

09:15 Thursday 20th December 2012

08.19

Negative feedback in survival of grassland plant seedlings

Petr Smilauer (Faculty of Science University of South Bohemia Czech Republic), Majka

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Smilauerova (Faculty of Science University of South Bohemia Czech Republic)

We followed the survival and performance of seedlings of two grass and two forb species in a grassland where the presence of forbs and grasses is experimentally manipulated on a long-term basis. Our results suggest better performance of forb seedlings in grass-only plots and vice versa, supporting negative feedback hypothesis.

09:30 Thursday 20th December 2012

08.20

Quantifying the soil community on green roofs

Heather Rumble (Royal Holloway University of London), Alan Gange (Royal Holloway University of London)

Green roofs are of increasing interest in ecology as an urban habitat, capable of supporting an array of above-ground organisms. However, little is known about the soil community despite its importance for ecosystem functioning. Over two years we have discovered a unique but impoverished soil community, capable of withstanding harsh conditions, and have analysed interactions between these organisms.

09:45 Thursday 20th December 2012

08.21

Seasonal cycles of species diversity

Vidar Grøtan (Centre for Conservation Biology Norwegian University of Science and Technology), Russel Lande (Imperial College London), Phil DeVries (University of New Orleans)

We show that cycles of species diversity in butterfly communities differ among two study sites located in Ecuador and Costa Rica. While cycles are annual in Ecuador, the cycles are biannual in Costa Rica. We also find the same pattern in intra-year variation of precipitation which suggests that this key environmental variable has a non-neutral effect on community dynamics.

10:00 Thursday 20th December 2012

08.22

Some like it hot... Others not. Population and community effects of temperature and habitat size in protist microcosms.

Marco Plebani (University of Zurich), Dennis Hansen (University of Zurich), Owen L Petchey (University of Zurich)

The Metabolic Theory of Ecology stipulates temperature to be a major driver of ecological processes by affecting organisms' metabolic rates. We tested theoretical predictions with a

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microcosm-based experiment, also accounting for the role of habitat size and species identity. The outcome of competition shifted along the temperature gradient, while population dynamics changed with temperature in both predicted and unexpected ways.

10:15 Thursday 20th December 2012

08.23

What do spatial patterns tell us about tropical forest dynamics?

Felix May (Helmholtz-Centre for Environmental Research - UFZ), Thorsten Wiegand (Helmholtz-Centre for Environmental Research - UFZ), Andreas Huth (Helmholtz-Centre for Environmental Research - UFZ)

We develop a spatially-continuous neutral model (SCNM), which includes tree interactions, demography and dispersal. We parameterize the model using Bayesian inference and tree census data from Barro Colorado Island, Panama. Our approach evaluates the ability of a neutral model to capture spatial patterns in forests. Based on departures between predictions and observations we suggest extensions to the basic neutral model.

Email Address for correspondence: felix.may@ufz.de

10:30 Thursday 20th December 2012

08.24

Species and phylogenetic alpha and beta diversity during forest succession in a Chinese subtropical forest

Juyu Lian (South China Botanical Garden CAS)

Determining the relative contribution of different mechanisms on the assembly and species coexistence of communities remains a major goal in ecology. We will seek to elucidate ecological mechanisms changing with life stage by comparing species and phylogenetic diversity and explore the relative importance of habitat heterogeneity and successional stages in explaining shifts of several ecological mechanisms with life stage.

10:45 Thursday 20th December 2012

08.25

The effect of local and regional factors on the macroinvertebrate communities of ponds

Ian AG Thornhill (University of Birmingham), Mark E Ledger (University of Birmingham), Lesley C Batty (University of Birmingham)

Rural ponds have been shown to contribute significantly to regional biodiversity. However, their biodiversity in urban areas has been largely overlooked. This talk

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presents the findings of a study which investigated the conservation value of urban ponds and the local (water quality, physical habitat) and spatial (land-use, connectivity) factors that influence community composition.

11:30 Thursday 20th December 2012

08.26

Towards a global model of local biodiversity responses to human impacts

Andy Purvis (Imperial College London), Lawrence N Hudson (Imperial College London), Tim Newbold (UNEP-WCMC), Sara Contu (Imperial College London), Samantha Hill (UNEP-WCMC), Igor Lysenko (Imperial College London), Adriana De Palma (Imperial College London), Michelle Harrison (Imperial College London), Lucinda Kirkpatrick (Imperial College London), Helen Phillips (Imperial College London), Sean Tuck (Imperial College London), Hannah White (Imperial College London), Robert M Ewers (Imperial College London), Georgina M Mace (UCL), Drew W Purves (Microsoft Research Cambridge), Jorn P W Scharlemann (UNEP-WCMC)

PREDICTS (Projecting Responses of Ecological Diversity In Changing Terrestrial Systems) aims to model ecological responses to anthropogenic change in order to make policy-relevant projections. To do this, we are collating existing data comparing community composition among sites. We outline the PREDICTS framework, present some initial results from the first 3000 sites - and ask for data!

11:45 Thursday 20th December 2012

08.27

Tracking vegetation states and transitions in response to multiple wildfires in the sagebrush-steppe

G. Matt Davies (University of Glasgow), Eva Dettweiler-Robinson (University of New Mexico), Peter Dunwiddie (University of Washington), Jon D Bakker (University of Washington)

Most state and transition models describe qualitative changes in plant communities in response to disturbances. We have developed a simple quantitative model to describe changes in sagebrush-steppe vegetation. The model has two axes, one relating to shrub dominance and the other to dominance by native species. This model can characterize transitions following wildfire and could help forecast potential future changes.

12:00 Thursday 20th December 2012

08.28

Trade-offs and Tough Luck: The effects of stochasticity on species coexistence

Stuart Nattrass (UCL), David J Murrell (UCL), Stephen Baigent (UCL)

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Trade offs are considered a crucial mechanism for promoting coexistence. We look at the effects of a trade off between fecundity and growth rate in canopy trees on the possibility of multiple species co-existing. Stochastic effects are introduced and the impact on co-existence examined using both analytical techniques and simulations.

12:15 Thursday 20th December 2012

08.29

Trait-mediated responses of individuals drive community-wide responses to environmental change

Andrew D Barnes (J.F. Blumenbach Institute of Zoology and Anthropology University of Göttingen), Rowan M Emberson (Department of Ecology Lincoln University New Zealand), Frank T Krell (Department of Zoology Denver Museum of Nature Science), Raphael K Didham (School of Animal Biology The University of Western Australia)

Trait-based ecology attempts to predict variability in species responses to anthropogenic disturbances. In Afrotropical dung beetle communities, we tested for trait-mediated responses to edge effects and adjacent matrix restoration. Species-level trait determinants were weak due to high, individual-level trait variability and strong environmentally-driven trait plasticity. Our results demonstrate the need to quantify individual-level traits for predictive accuracy in trait-based ecology.

12:30 Thursday 20th December 2012

08.30

Variability in functional traits mediates plant interactions along stress gradients

Christian Schöb (The James Hutton Institute), Cristina Armas (Estación Experimental de Zonas Áridas EEZA-CSIC), Manuela Guler (Estación Experimental de Zonas Áridas EEZA-CSIC), Ivan Prieto (Centre d'Ecologie Fonctionnelle et Evolutive CNRS), Francisco I Pugnaire (Estación Experimental de Zonas Áridas EEZA-CSIC)

Changing abiotic conditions may strongly affect plant functional traits and growth habit. We found that physiological and morphological traits in an alpine cushion species varied with elevation, in parallel with its effects on soil conditions and consequently its positive effects on other species. This highlights the importance of nurse plants' traits for its facilitation effect.

12:45 Thursday 20th December 2012

08.31

Spatio-temporal variation in the nutrition of honey bee colonies: seasonal and landscape level effects based on Countryside Survey land cover map data

Philip Donkersley (Lancaster Environment Centre), Kenneth Wilson (Lancaster Environment Centre), Roger Pickup (Lancaster Environment Centre), Glenn Rhodes

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(Centre of Ecology and Hydrology), Kevin Jones (Lancaster Environment Centre)

Honey bees forage for pollen as a primary source of protein for the hive and store it within the hive as 'bee bread'. Working with hobbyist beekeepers located across northwest England, we used stratified sampling to determine how the nutritional content of bee bread varied both temporally through the beekeeping season and spatially, using landscape-scale data from the Countryside Survey

13:00 Thursday 20th December 2012

08.32

Why exactly are there fewer insect species in secondary than primary tropical rainforests?

Vojtech Novotny (Biology Centre Czech Academy of Sciences), Tom Fayle (Biology Centre Czech Academy of Sciences), Petr Klimes (Biology Centre Czech Academy of Sciences), Ondrej Kaman (Biology Centre Czech Academy of Sciences), Scott Miller (Smithsonian Institution USA), George Weiblen (University of Minnesota USA)

Notoriously, secondary tropical vegetation hosts fewer insect species than primary rainforests, but it is difficult to explain this difference by specific vegetation traits since the two forest types differ in so many of them. We use rainforest plots in New Guinea to demonstrate a new method of partitioning diversity difference and attributing it to the effect of individual forest traits.

13:15 Thursday 20th December 2012

ECOSYSTEM SERVICES

18.1

Ecosystem service provision maps, models and optimization from city-to-regional scale

Maria Luisa Avila-Jimenez (Environmental and Sustainability Institute), Richard Inger (Environmental and Sustainability Institute), Kevin J Gaston (Environmental and Sustainability Institute)

Increasing attention is being paid to the provision of ecosystem services within urban areas, those places where the beneficiaries of those services reside at greatest densities. Here we report the influence of scale and densification on this provision, providing essential background for urban planning, greenspace management, conservation measures and sustainable development.

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18.2

Ecosystem service provision sets the pace for pre-Columbian Andean societal development

William D Gosling (The Open University), Joseph J Williams (University of Aberystwyth)

In the central Andes water and woodlands have been critical resources for human populations over the last 5000 years. During this period societies have developed from hunter-gatherers into 'civilizations'. Palaeoecological and archaeological records reveal coincident cycles of past environmental and societal change showing that long-term (>100 year) societal development was paced by both increases and decreases in ecosystem service provision.

11:30 Tuesday 18th December 2012

18.3

Shifting Baselines in Coastal Ecosystem Service Provision

Samiya A Selim (University of Sheffield), Tom Webb (University of Sheffield), Julia Blanchard (University of Sheffield), Philip Warren (University of Sheffield)

Humans depend on the marine environment for a range of ecosystem services, but our activities have altered ecosystem states, making it difficult to set baselines for management policies. We use historical data to infer services linked to ecosystem structure/state and how these have changed through time. We highlight potential benefits from knowledge of past reconstruction in ecosystem service provision.

11:45 Tuesday 18th December 2012

18.4

Social-ecological Innovation in the City: Making the Most of the Urban Landscape?

Matthew Dennis (University of Salford), Philip James (University of Salford), Richard Armitage (University of Salford)

Cities suffer from high disturbance, low quality habitats and reduced access to green space. Social-ecological innovation can mitigate against loss of quality naturalistic spaces and their associated ecosystem services. A mapping study of sites of social-ecological innovation in Manchester showed their distribution was uneven due to environmental and social factors.

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18.5

A critical appraisal of payments for ecosystem services: to pay or not to pay?

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Adam P Hejnowicz (University of York), Dave G Raffaelli (University of York), Murray Rudd (University of York), Piran C L White (University of York)

Is the popularity of payments for ecosystem services justified based on current scheme outcomes? Advocated widely in policy circles do PES improve upon existing command-and-control strategies? Furthermore, is the view that they de-centralise bureaucracy, increase ownership over local natural resources and provide transparent linkages between service providers and beneficiaries accurate? This talk critically appraises current thinking surrounding PES.

12:15 Tuesday 18th December 2012

18.6

Alternative routes for development of PES schemes at catchment scale; Lake Naivasha, Kenya

David M Harper (University of Leicester), Ed H.J. Morrison (University of Leicester), Nic Pacini (University of Calabria Italy), Caroline Upton (University of Leicester), Philip Cook (University of Connecticut), Mark Ellis-Jones (Independent)

The ecosystem services from the Naivasha basin are dominated by irrigated roses exported over the world – one of Kenya's top 3 currency earners. The value of this trade coupled with the degradation of the lake, has led to the development of several schemes which seek to recycle money earned into ecosystem restoration and conservation. We examine five schemes.

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18.7

Dispelling the myth of win-wins: analysing trade-offs in ecosystem service-based conservation and development

Caroline Howe (University College London), Georgina Mace (University College London), Bhaskar Vira (University of Cambridge)

We carried out a systematic review of the literature on where ecosystem service interventions had the potential to or resulted in trade-offs. Of 1092 potentially relevant articles, 213 were selected for review. Trade-offs arise between services (biophysical trade-offs) and between benefits from services (trade-offs between stakeholders). We analyse why these different trade-offs occur and discuss the economic and policy implications.

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18.8

Exploring the biodiversity science-policy interface: Lessons learned from the UK

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National Ecosystem Assessment

Juliette C Young (CEH), Kerry Waylen (JHI)

We explore communication in the process of developing the UK National Ecosystem Assessment (NEA) based on qualitative analysis of individual experiences. We highlight dissatisfactions and challenges in communicating between disciplinary and sectoral groups. Based on our results, we suggest ideas to improve NEA follow-on initiatives and general efforts to improve biodiversity science-policy interfaces.

13:00 Tuesday 18th December 2012

18.9

Linking Sustainable Drainage Systems (SuDS) and ecosystem services: new connections in urban ecology

Chunglim Mak (University of Salford), Philip James (Environmental and Urban Research Peel Building University of Salford), Miklas Scholz (Civil Engineering Research Centre Newton Building University of Salford)

The relationship between Sustainable Drainage Systems (SuDS) and ecosystem services has not been articulated clearly, leading to misinformed and inadequate SuDS designs. A new conceptual model, informed by literature review, sets out the relationship between SuDS and ecosystem services in a way that facilitates greater understanding and better decision-making by SuDS planners and designers.

15:00 Tuesday 18th December 2012

18.10

Managing mangroves for carbon conservation: a controlled experiment on the effects of cutting

Mark R Huxham (Edinburgh Napier University), Joseph Langat (Edinburgh Napier University), Maurizio Mencuccini (Edinburgh University), Steven Bouillon (Katholic University Leuven), Waldron Susan (Glasgow University), James Kairo (Kenya Marine and Fisheries Research Institute)

Mangroves are powerful natural carbon sinks and can raise the forest floor in response to sea level rise. A field experiment in Kenya explored the effects of tree removal on greenhouse gas emissions and sediment elevation. Treatment caused significantly higher fluxes of CO₂ and CH₄ and rapid subsidence, with important implications for managing mangroves as carbon stores and coastal buffers.

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18.11

Visitor perception of features that impact recreational value at a restored floodplain

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Daniel Richards (University of Sheffield), Philip Warren (University of Sheffield), Lorraine Maltby (University of Sheffield)

One common aim of wetland restoration is to increase the recreational value of an area. The quality of experience gained from visiting a restored site is affected by the balance of positive and negative features that are present, and the availability of those features to the visitor. Here we examine the interaction of these effects at a case study floodplain.

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18.12

Understanding the full impact of biofuel production on ecosystem services

Robert A Holland (University of Southampton), Gareth Brown (Imperial College London), Rob Ewer (Imperial College London), Valerie Kapos (UNEP-WCMC), Ann H Muggeridge (Imperial College London), Jorn Scharlemann (UNEP-WCMC), Gail Taylor (University of Southampton), Louise Woods (UNEP-WCMC), Felix Eigenbrod (University of Southampton)

We present a comprehensive review of the impact of liquid biofuel production on ecosystem services. We show that 1) there is little evidence for impacts for most non-regulating services; 2) that most studies that do exist are modelled rather than empirical and 3) that there is some evidence that second generation biofuels have less impacts than first generation fuels.

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18.13

Urban soil organic carbon storage: measurement and management of an undervalued ecosystem service in densely urbanised Europe

Jill L Edmondson (University of Sheffield), Odhran O'Sullivan (University of Sheffield), Nicola McHugh (University of Sheffield), Jonathan Potter (University of Sheffield), Kevin J Gaston (University of Exeter), Jonathan R Leake (University Sheffield)

Soils form the foundation of terrestrial ecosystems, and are vital as they hold 75% of organic carbon (OC) stocks sequestered from the atmosphere. Urbanisation is widely presumed to degrade ecosystem services including OC storage. Quantification of urban soil OC stocks reveal that previous national inventories have seriously underestimated the contribution of cities and towns to provision of this ecosystem service.

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29.1

The ecology of 'junk' DNA: A model for the dynamics of endogenous retroviruses

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Tim Coulson (Imperial College London), Ravinder Kanda (Imperial College London)

Vertebrate DNA is littered with the signatures of past retroviral infections. Surprisingly, there is little evidence of active endogenous retroviruses. Using modelling tools from ecology we ask the question why does so much of the vertebrate genome consist of signatures of past epidemics? Our work reveals how ecological methods can be used to address questions that ecologists rarely think about.

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29.2

Effects of a disease on the dynamics and stability of a stage structured population model

Maarten C Boerlijst (Institute for Biodiversity and Ecosystem Dynamics - University of Amsterdam)

We explore the effects of adding a disease to a stage structured population model with a bottleneck in maturation. The disease can specifically target one ontogenetic stage, or it can affect all stages. We vary disease parameters such as infectiousness and virulence, and we consider cases where the disease decreases fecundity or slows down maturation.

11:30 Tuesday 18th December 2012

29.3

Endoscopy as a novel method for assessing endoparasite burdens in free-ranging European shags (*Phalacrocorax aristotelis*)

Sarah Burthe (CEH), Mark Newell (CEH), Gidona Goodman (University of Edinburgh), Adam Butler (BIOSS), Sarah Wanless (CEH), Emma Cunningham (University of Edinburgh), Francis Daunt (CEH)

Parasites are a key driver of evolutionary processes in wild animals. However, quantifying endoparasite burdens non-destructively can be problematic. We successfully utilised endoscopy in a wild seabird host in the field as a method for measuring natural nematode burdens and verifying that drug treatment removed parasites. Endoscopy was found to be a rapid, reliable and repeatable method for assessing parasite burdens in this system.

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29.4

A Fractal Explorer For the Tree of Life

James Rosindell (Imperial College London), Luke J Harmon (University of Idaho)

Scientific knowledge of the tree of life is expanding rapidly, but the methods used for visualising it are restrictive. Here we present a new and visually appealing way to explore

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large phylogenetic trees with metadata, using fractals and a zooming interface. The software should help scientists explore large datasets and also help communicate ecological and evolutionary concepts to the public.

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29.5

A novel, simulation-based method for predicting the impacts of habitat conversion, latitudinal gradients, and species extinctions on arthropod-plant interaction networks

Tom M Fayle (University of South Bohemia), Petr Klimes (Czech Academy of Sciences), George D Weiblen (University of Minnesota), Jan Hrcek (University of South Bohemia), Vojtech Novotny (Czech Academy of Sciences)

Here we introduce a novel analytical method in which individual trees (including their arthropod communities) are selected from a source dataset to match communities from a target plot in terms of tree abundance, size distribution and community phylogeny. This allows prediction of the arthropod communities in the target area, with deviations revealing changes in the underlying rules dictating community structure.

12:15 Tuesday 18th December 2012

29.6

Anomalous speeds in polymorphic populations

Elizabeth C Elliott (University of Leeds), Stephen J Cornell (University of Leeds)

Predicting the invasion speed of polymorphic populations has revealed that anomalous speeds may be important. These occur when a polymorphic population invades faster than a single morph. Using a discrete model we show that these speeds persist when there is demographic stochasticity if population densities or mutation rates are high.

12:30 Tuesday 18th December 2012

29.7

Dynamic species distribution models from categorical survey data

Gregg Milligan (University of Liverpool), Nova Mieszkowska (Marine Biological Association), Mike Burrows (Scottish Association for Marine Science), Rob Freckleton (University of Sheffield), Matthew Spencer (University of Liverpool)

A typical species distribution model is static. We describe species distribution models for categorical abundance data that have an explicit temporal component. We use our approach to study the distribution and dynamics of two intertidal invertebrates, the top shells *Osilinus lineatus* and *Gibbula umbilicalis*, based on data from approximately 100 sites surveyed over 8 years

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29.8

Integrating evolution into ecological modelling: a phenotype-gambit approach

Aristides (Aris) Moustakas (Queen Mary University of London), Matthew Evans (Queen Mary University of London)

A model that takes a phenotypic-gambit approach and focuses on changes in the frequency of phenotypes within a population, using as an example seasonal breeding was developed. Results showed that the phenotypic approach has utility when attempting to accommodate evolution within an ecological model. Simplified model variants were explored in order to examine how complex should an eco-evolutionary model be.

13:00 Tuesday 18th December 2012

29.9

Linking individual-level observations to macro-scale behaviour: a mathematical approach

Maria Bruna (University of Oxford), Jon Chapman (University of Oxford)

In ecology, systems composed of many individuals that combine to exhibit a collective behaviour are prevalent – e.g., insect swarms. Whilst models rooted at the individual level can account for empirical observations, they are often impractical and incapable of predicting macro-scale evolution. We present a mathematical theory that can explain how interactions and changes at the micro-scale affect the global dynamics.

15:00 Tuesday 18th December 2012

29.10

The role of direct vs. delayed density dependence in rodent population cycles: insights from nonlinear models

Frederic Barraquand (University of Tromsø), Adrien Pinot (Centre d'Etudes Biologiques de Chizé - CNRS), Nigel G Yoccoz (University of Tromsø)

Population cycles in voles and lemmings are often thought to require one-year delayed density-dependence (DD), with specialist predators causing crashes. Re-analysing data, and contrasting popular log-linear models with non-linear ones, we show that direct DD is less stabilising than previously thought, and delayed DD can have a different role than that assumed by current theory.

15:15 Tuesday 18th December 2012

29.11

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Estimating the environmental dependence of ecological parameters.

Gian Marco Palamara (University of Zurich), Christopher Clements (University of Sheffield), Matthew J. Smith (Microsoft Research), Owen L. Petchey (University of Zurich)

The ability to infer temperature dependence of biological rates is crucial for predicting the response of ecological systems to environmental change. We simulate temperature dependent population time series and use them to test parameter estimation methods. Comparing different methods we obtain accurate estimates of activation energy for simulated data. We use time series from microbial aquatic communities as case studies.

15:30 Tuesday 18th December 2012

29.12

Modelling plant community dynamics as a replacement network.

Julio M Alcantara (Universidad de Jaen), Pedro J Rey (Universidad de Jaen), Jesus M Bastida (CIEco-UNAM), Gemma Siles (Universidad de Jaen)

Plant community dynamics can be interpreted as the eventual replacement of individual plants by other individual/s of the same or different species. This replacement is the result of interspecific juvenile-adult interactions which configure a “replacement network”. We describe a model that uses this framework to study the network structure and dynamics of woody plant communities.

15:45 Tuesday 18th December 2012

ECOLOGY AND FUNCTION OF DISTURBED AND FRAGMENTED FORESTS

40.1

Ecological value of logged and fragmented tropical forests

Marion Pfeifer (Imperial College London), Rob Ewers (Imperial College London)

Evidence linking biodiversity to physical or climatic environmental diversity variables (ED) across scales are rare. Our study uses the set-up of the SAFE (**Stability of Altered Forest Ecosystems Project**) project to analyse forest structural complexity and its links to forest processes and biodiversity. We quantify these links using local- and landscape-scale (logging and fragmentation) ED accounting for scale-dependency in relationships

11:15 Tuesday 18th December 2012

40.2

Annual and short variation in tree and forest growth assessed with band dendrometers

Geoffrey G Parker (Smithsonian Environmental Research Center), Joshua Brinks (University of Pennsylvania), Sam Perron (Smithsonian Institution), Francisca Saavedra (University of Maryland), Nancy Khan (Smithsonian Institution), Jeffrey Lombardo (Dartmouth College), Sean McMahon (Smithsonian Institution), Dan Bebbler (Earthwatch Institute)

Tree diameter growth responds to many environmental factors. In this study we monitored the weekly growth of 100 trees in a mature mixed species forest on the mid-Atlantic coastal plain, USA, during three growing seasons. Here we present estimates of the aboveground biomass dynamics and the influences of short-term variations in water availability on whole-forest growth.

11:30 Tuesday 18th December 2012

40.3

Vegetation Structure and Composition of Tropical Evergreen and Deciduous Forests in the Western Ghats; Implications of Impacts of Climate Change on Forest Product Flows and Forest Dependent Communities

Ravindranath NH (Indian Institute of Science), Indu K Murthy (Indian Institute of Science)

Forests in the Western Ghats, a biodiversity hotspot are subjected to human disturbance and use. Currently, there is limited evidence on the status and dynamics of tropical forests as well the forest product flow, in the context of human disturbance and climate change. This paper presents structure, composition and forest product flow of tropical evergreen and deciduous forests.

11:45 Tuesday 18th December 2012

40.4

Life history traits and landscape characteristics predict macro-moth responses to forest fragmentation at a landscape-scale

Eleanor M Slade (University of Oxford), Thomas Merckx (University of Oxford), Terhi Riutta (University of Oxford), Daniel P Bebbler (Earthwatch Institute), David Redhead (University of Oxford), Philip Riordan (University of Oxford), David W Macdonald (University of Oxford)

How best to manage woodland patches, mitigate the consequences of habitat fragmentation, and enable landscape permeability are key questions facing conservation scientists. Using a landscape-scale mark-release-recapture study on macro-moths we

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looked at how life-history traits and landscape characteristics affect species abundance, composition and movements. Moreover, this study would have been be unfeasible without the use of citizen scientists.

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40.5

Soil ecosystem functioning in a fragmented temperate woodland landscape

Terhi Riutta (University of Oxford), Eleanor M Slade (University of Oxford), Nathalie Butt (University of Oxford), Paul Eddowes (Earthwatch Institute), Daniel P Bebber (Earthwatch Institute), Michael D Morecroft (Natural England), Philip Riordan (University of Oxford), David W Macdonald (University of Oxford), Yadvinder Malhi (University of Oxford)

This study examined the effects of forest fragmentation on multiple soil processes: decomposition of recalcitrant and easily decomposing leaf litter in the presence and absence of soil macrofauna, soil CO₂ flux including and excluding leaf litter, and soil fauna feeding activity. The process rates were best explained by soil moisture, which correlated positively with the distance to the edge.

12:15 Tuesday 18th December 2012

40.6

Leaf litter decomposition in subtropical forests with different cutting regimes.

Naili Zhang (Institute of Botany the Chinese Academy of Sciences), Piao Song (Institute of Botany the Chinese Academy of Sciences)

Litter decomposition is a critical process driving ecosystem C and nutrient cycling, and especially vulnerable to disturbance. Decomposition loss from leaves of *Castanopsis eyrei*, *Schima superb*, *Cyclobalanopsis glauca* and *Cunninghamia lanceolata* were estimated in subtropical forests with different cutting regimes in southern China. Different patterns of leaf litter decomposition were seen among four plant species in these forests.

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40.7

Tree diversity and above-ground biomass in succession of the Atlantic Forest, Brazil

Daniel P Bebber (Earthwatch), Robson Capretz (SPVS), Marcelo Reginato (SPVS), Viktor Zwiener (SPVS), Ricardo M Britez (SPVS)

The Atlantic Forest is a biodiversity hotspot which originally covered 17.4% of the Brazilian territory. Currently 8% of the forest remains. Twelve 1 ha permanent sample plots along a successional gradient were enumerated to estimate the rate and mode of recovery in biodiversity and biomass. Data show that secondary forest remain depauperate in species

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diversity long after abandonment.

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40.8

Do hurricanes create a carbon sink in tropical forests?

Percival P. Cho (Lancaster University), George A Blackburn (Lancaster University), Jos Barlow (Lancaster University)

Whether catastrophic disturbances such as hurricanes create a carbon sink in tropical forests is unknown. Here, we present pre- and post-hurricane data from permanent sample plots in northern Central America affected by a category 4 hurricane in 2001. The data span 20 years with over a decade of post-hurricane growth.

15:15 Tuesday 18th December 2012

40.9

Impacts of drought, fire and logging on tropical forests in Africa: Modelling the dynamics of rainforests.

Rico Fischer (Helmholtz Centre for Environmental Research UFZ Leipzig Germany), Amanda Armstrong (Department of Environmental Sciences Clark Hall University of Virginia), Herman H. Shugart (Department of Environmental Sciences Clark Hall University of Virginia), Andreas Huth (Helmholtz Centre for Environmental Research UFZ Leipzig Germany)

Up to half of the estimated aboveground carbon of global vegetation is stored in tropical forests. Large areas of rainforest are disturbed due to climate change and human influence. Using the process-based, individual-oriented forest model FORMIND we analyse how drought, fire and logging modify dynamics and carbon flux of African rainforests.

15:30 Tuesday 18th December 2012

40.10

Taxonomic and functional patterns in the response of tropical forest species to land-use change

Tim Newbold (UNEP World Conservation Monitoring Centre), Lawrence Hudson (Imperial College London), Sara Contu (Imperial College London), Samantha Hill (UNEP World Conservation Monitoring Centre), Igor Lysenko (Imperial College London), Adriana De Palma (Imperial College London), Michelle Harrison (Natural History Museum London), Lucinda Kirkpatrick (Natural History Museum London), Helen Phillips (Imperial College London), Sean Tuck (Imperial College London), Hannah White (Imperial College London), Robert M Ewers (Imperial College London), Georgina M Mace (Imperial College London), Drew W Purves (Microsoft Research Cambridge), Jorn P W Scharlemann (UNEP World

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Conservation Monitoring Centre), Andy Purvis (Imperial College London)

Land-use change is the primary driver of biodiversity loss. Different taxonomic and functional groups respond differently to land-use change, with implications for ecosystem structure and function. We illustrate taxonomic and functional patterns in responses to land-use in tropical forests worldwide using the database on community abundance composition of the PREDICTS (Projecting Responses of Ecological Diversity in Changing Terrestrial Systems) project.

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40.11

Effects of fire and drought disturbance on Amazon forest carbon cycling

Daniel Metcalfe (Swedish University of Agricultural Sciences), Yadvinder Malhi (University of Oxford), Chris Doughty (University of Oxford), Antonio Da Costa (Universidade Federal do Pará Brazil), Wanderley Rocha (Amazon Environmental Research Institute Brazil), Paulo Brando (Amazon Environmental Research Institute Brazil), Patrick Meir (University of Edinburgh)

Drought and fire disturb large areas of the Amazon rainforest with poorly understood consequences for ecosystem carbon storage. All major ecosystem carbon fluxes were recorded in two large-scale disturbance experiments in Amazon forest: one simulating drought and the other, natural ground fires. Results highlight areas of similarity and divergence in ecosystem carbon cycling responses to these contrasting disturbances.

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40.12

Tropical Montane Cloud Forests carbon dynamics after forest fires

Immaculada Oliveras (University of Oxford), Yadvinder Malhi (University of Oxford), Erickson Urquiaga (Universidad de Santo Antonio Abad del Cusco), Jose Antonio Quintano Loyaza (Universidad de Santo Antonio Abad del Cusco), Jose Kala-Mamani (Universidad de Santo Antonio Abad del Cusco), Nohemi Lizarraga (Universidad de Santo Antonio Abad del Cusco), Guisela Sanz Romani (Universidad de Santo Antonio Abad del Cusco)

Tropical Montane Cloud Forests harbour exceptional levels of biodiversity and endemism. They sit immediately below a zone of climatic tension where substantial elevation warming is likely to enhance fire presence. In this study we present data on above-ground carbon stocks in burned and unburned TMFCs sites (>2300m) with different fire chronosequences.

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40.13

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Reforestation and its effects on the herpetofauna of Madagascar.

Katy T Bell (Queen's University Belfast), Alison Cameron (Queen's University Belfast)

This project looked at the effects of reforestation on herpetofauna biodiversity in Madagascar by conducting surveys of 3 habitats; closed canopy forest, reforested areas, and cleared areas. The forest proved to be the most species diverse habitat for both taxa, with the greatest abundance of reptiles, but species abundance of frogs was found to be highest in the reforested site.

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40.14

Novel image processing based methods to classify fragmented landscapes

Veronique A Lefebvre (Imperial College London), Marion Pfeifer (Imperial College London), Andrew Bradley (Imperial College London), Robert Ewers (Imperial College London)

To understand and predict changes in biodiversity with increasing fragmentation of natural habitat the configuration and geometrical properties of landscapes need to be assessed. We present novel computational methods evaluating pixel-based maps of landscapes to 1) flexibly delineate habitat patches and 2) characterise shape properties independently from size, for subsequent modelling of the biodiversity response to fragmentation of forest habitats.

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BIODIVERSITY AND CONSERVATION SCIENCE

42.1

Past, present and future impacts of nitrogen deposition on UK biodiversity

Richard J Payne (Manchester Metropolitan University), Nancy B Dise (Manchester Metropolitan University), Carly J Stevens (Lancaster University)

Nitrogen deposition is one of the greatest threats to UK biodiversity. Using observed relationships between species richness and cumulative N deposition, national deposition models and various deposition scenarios, we model how N has driven changes in UK biodiversity in the past and how these impacts may evolve in the future.

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42.2

Fostering new hope: Assisted breeding and reintroduction of the brush-tailed rock

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wallaby (*Petrogale penicillata*) into the Grampians National Park, Victoria, Australia

David A Taggart (University of Adelaide South Australia), David Schultz (Schultz Foundation South Australia), Tony Corrigan (ACT Parks Conservation Service Australia), Mike Stevens (Parks Victoria Australia), David Dobrozczyk (Tidbinbilla Nature Reserve Australia), Glenn Rudolf (Dept of Sustainability Environment Victoria Australia)

The brush-tailed rock wallaby is one of Australia's threatened species. Cross-fostering techniques have been used to accelerate breeding in order to supply animals for reintroduction. Initial reintroductions have occurred into the Grampians National Park, Victoria. Mortality from a variety of causes has resulted in a significant loss of animals post release. The species remains on a knife edge.

11:30 Tuesday 18th December 2012

42.3

The biodiversity of natural and artificial upland blanket peat bog pools

Sorain J Ramchunder (University of Leeds), Lee E Brown (University of Leeds), Joseph Holden (University of Leeds)

Dystrophic water bodies >2 ha in the UK uplands are priority habitats under UK BAPs, yet the biodiversity of the numerous smaller pools is poorly understood. Recently, artificial drain-blocking has created thousands of new pools. This study showed community composition between both pool types was similar. Drain-blocking therefore seems to be beneficial for the expansion of upland aquatic macro-invertebrates.

11:45 Tuesday 18th December 2012

42.4

An investigation into factors affecting the establishment of sown Yellow-Rattle (*Rhinanthus minor*) in species-poor grassland

Markus Wagner (CEH Wallingford), Sarah Hulmes (CEH Wallingford), Lucy Hulmes (CEH Wallingford), Jodey Peyton (CEH Wallingford), Matt Heard (CEH Wallingford), James Bullock (CEH Wallingford), Richard Pywell (CEH Wallingford)

Yellow-Rattle, *Rhinanthus minor*, is widely used in grassland diversification to keep productive grasses in check and to promote grassland forbs. Here, we present the results of an experimental study of various factors and their interactions that may affect establishment of sown Yellow-Rattle of three lowland ecotypes. These factors included level of pre-sowing bare ground creation, sowing density, and grassland type.

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42.5

Assessing the ecological effectiveness of protected areas using botanical re-survey

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data

Louise Ross (James Hutton Institute), Sarah Woodin (University of Aberdeen), Alison Hester (James Hutton Institute), Des Thompson (Scottish Natural Heritage), John Birks (University of Bergen)

Protected areas are regarded as being central to biodiversity conservation, yet analyses of their effectiveness are often hampered by a lack of meaningful baseline data. We use botanical data from the 1950s and 2007-08 to compare vegetation change occurring within and out-with Sites of Special Scientific Interest in the Scottish Highlands.

12:15 Tuesday 18th December 2012

42.6

Assessing the ecological integrity of New Zealand's native forests

Catriona J MacLeod (Landcare Research), Peter Bellingham (Landcare Research), Elaine Wright (Department of Conservation), Sarah Richardson (Landcare Research), Kathryn Affield (Landcare Research), Andrew Gormley (Landcare Research), Dave Forsyth (Arthur Rylah Institute), Robert Allen (Landcare Research)

New Zealand recently established a Biodiversity Monitoring and Reporting System to assess whether ecological integrity on public conservation lands is being maintained. Results will be presented for five measures of ecological integrity considering both native and exotic species, using information drawn from an unbiased sample of locations within native forests.

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42.7

At home or refugee? Treeline shrubs in an oceanic climate

Diana Gilbert (The James Hutton Institute), Alison Hester (The James Hutton Institute), Colin Legg (The University of Edinburgh), Ruth Mitchell (The James Hutton Institute)

We report site characteristics for sample populations of three understudied UK montane shrubs: *Betula nana*, *Salix myrsinites* and *Juniperus communis* and present analysis of the relationship between site characteristics and population condition. We assess the condition of Scottish populations in the context of threats from climate change and land management and make recommendations for conservation management.

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42.8

Building the evidence base for ecological impact assessment and mitigation

Richard Arnold (Thomson Ecology), David Hill (Environment Bank)

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A talk based on the Practitioners Perspective article in Journal of Applied Ecology (Feb 2012) with the same title. I will build on the arguments set out in the paper and provide an overview of the current situation, including reference to biodiversity offsetting. I will provide a consultant ecologist's perspective of the need for evidence underpinning planning decisions.

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42.9

Can a basket of diversity indicators inform the nature conservation status of European farms?

Peter Dennis (Aberystwyth University)

A selective review and field evaluation of existing biodiversity indicators was carried out on diverse European farms (EU BioBio project). Indicators of habitats, plants and animals were selected based on scientific credibility, cost effectiveness and stakeholder preference but do they reflect overall conservation status, reflecting rarity and species of restricted distribution?

15:00 Tuesday 18th December 2012

42.10

Change in propagule banks during prescribed burning: a tale of two contrasting moorlands

Rob Marrs (University of Liverpool), HyoHyeMi Lee (University of Liverpool), Mike Harris (University of Liverpool), Angus Rosenborough (University of Liverpool), Hugh McAllister (University of Liverpool), Josu G. Alday (University of Liverpool)

The propagule bank can have an important function in restoring an ecosystem after damage. Here we compare the surface propagule banks in two contrasting moorlands, one degraded and one less so. In both the impacts of prescribed burning is assessed on surviving propagules. The implications of these results will be discussed from a conservation perspective.

42.11

Comparing Land Use Survey Methods For Analysis Of Bird Habitat Associations

Christopher J Rhodes (Centre for Ecology Hydrology), Lisa R Norton (Centre for Ecology Hydrology), Gavin M Siriwardena (British Trust for Ornithology), Mark J Whittingham (Newcastle University)

Using field (Countryside Survey) and satellite based (Land Cover Map) survey data on

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land use in Great Britain, bird habitat associations were modelled using national breeding bird count data. The predictive power of models using the two sets of habitat predictors was compared in order to inform the design of future survey and analytical work.

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42.12

Conservation implications of behavioural responses by hippopotami to changes in water availability

Mark Hassall (University of East Anglia), Chris Timbuka (Tanzania National Parks Authority), Ros Boar (University of East Anglia)

African national parks form cornerstones on which biodiversity conservation policy is built but their boundaries do not coincide with catchment area boundaries. Increasing human populations and changing land use upstream of parks are reducing river inflows, potentially damaging park ecology. Behavioural responses by hippopotami to changing water availability in Katavi National Park, Tanzania, are presented as a case study.

15:45 Tuesday 18th December 2012

42.13

Ecology of hazel gloves, a UK BAP fungus.

Katherine C Grundy (The James Hutton Institute), Andy FS Taylor (The James Hutton Institute)

Hazel gloves (*Hypocreopsis rhododendri*) is a rare epiphytic fungus found in ancient, oceanic hazel woodland on the west coasts of Britain and Ireland. We report the findings of research into the distribution, habitat preference, temporal dynamics, trophic status and evolutionary history of this species, and discuss the implications for its conservation.

16:00 Tuesday 18th December 2012

42.14

Effects of moorland rotational heather burning on soils and streams

Lee E Brown (Uni of Leeds), Joseph Holden (Leeds), Sheila Palmer (Leeds), Kerrylyn Johnson (Leeds), Katie Aspray (Leeds), Catherine Wearing (Leeds)

We present results from the NERC funded EMBER (Effects of Moorland Burning on the Ecohydrology of River basins) project. At ten study sites (five burned, five unburned) across northern England, the effects of rotational heather burning on soil hydrology, physical and chemical properties, stream water chemistry, hydrology and aquatic biodiversity have been examined in detail since 2010.

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42.15

Fire severity and fuel consumption following moorland wildfires

Rut Domenech-Jardi (University of Glasgow), G. Matt Davies (University of Glasgow), Alan Gray (Centre for Ecology and Hydrology)

Fire severity is known to vary with burning conditions but currently little data exists for heather moorlands. We adapted the Composite Burn Index to assess the severity of wildfires that burnt in spring 2011 and 2012. Fire severity varied substantially within and between wildfires whilst fuel consumption, and thus carbon emissions, appear to be greater than for prescribed burns.

16:30 Tuesday 18th December 2012

42.16

High bee and wasp diversity in a heterogeneous tropical farming system compared to protected forest

Christof Schüepp (University of Bern), Sarah Rittiner (University of Bern), Martin Entling (University of Koblenz-Landau)

In the tropics, farming is usually regarded as main threat to biodiversity. We compared biodiversity of bees and wasps between heterogeneous small-scale farmland and protected forest in Belize. Alpha and spatiotemporal beta diversity were consistently equal or higher in farming areas compared to forest. We conclude that heterogeneous farmland may conserve or even favour biodiversity of some taxonomic groups.

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42.17

Identifying indicator species and monitoring priorities: applying a niche-based approach to European forest birds

Simon Butler (University of East Anglia), Amy Wade (University of Reading), Boris Barov (Birdlife Europe), Ian Burfield (Birdlife International), Richard Gregory (RSPB), Ken Norris (University of Reading)

Species selection is crucial in determining the metric value of multi-species indicators which are frequently used as surrogate measures of wider biodiversity health. Using European forest birds as a model system, we demonstrate the application of an objective, niche-based approach to species' selection and use it to identify monitoring priorities that would ensure better ecological coverage.

09:00 Wednesday 19th December 2012

42.18

Long-term effects of ozone on the composition of a semi-natural grassland community

Naomi Rintoul (Environment Department University of York York), Joanna Whitton (Environment Department University of York York), Amy Martin (Biology Department University of York York), Kerstin Wedlich (Environment Department University of York York), Simon Peacock (IRES: Biology Division University of Newcastle Newcastle), Neil Cape (Centre for Ecology Hydrology Edinburgh), Jeremy Barnes (IRES: Biology Division University of Newcastle Newcastle), Mike Ashmore (Environment Department University of York York), Sylvia Toet (Environment Department University of York York)

The ecological implications of rising background tropospheric ozone concentrations are uncertain. We report results from a five-year free-air release experiment in a UK upland grassland community showing that small increases in ozone exposure affect the biomass of individual species and functional groups, but have no effect on total above-ground biomass.

09:15 Wednesday 19th December 2012

42.19

Management of dominant *Carex* species on floodplain meadows.

Sonia K. Newman (The Open University), David J. Gowing (The Open University), Mike E. Dodd (The Open University), Carly J. Stevens (Lancaster University)

Successive summer flood events coupled with missed hay cuts have led to a dominance of highly competitive *Carex* species on UK floodplain meadows. This study has focused on increasing species richness and reducing *Carex* cover by altering the management regime. Frequency of mowing is most important in controlling *Carex* on floodplain meadows.

09:30 Wednesday 19th December 2012

42.20

PVA re-visited – how habitat size and quality, fragmentation and isolation are affecting the dry sandy grassland species *Armeria maritima* ssp. *elongata*.

Peter Poschlod (Institute of Botany University of Regensburg), Michaela Adlmüller (Institute of Botany University of Regensburg), Harald Biedermann (Institute of Botany University of Regensburg), Kathrin Günther (Institute of Botany University of Regensburg), Klaus Neugebauer (Institute of Botany University of Regensburg), Christoph Reisch (Institute of Botany University of Regensburg)

Dry sandy grasslands have suffered from a strong decline in Southern Germany (1% compared to the beginning of the 19th century left). The remnants are often small, not

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managed and strongly isolated. Population (age structure, reproduction, genetic diversity, dispersal and pollination) and habitat quality studies (vegetation structure, LAI, soil parameters) show a detailed picture on a viable population of *Armeria*.

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42.21

Slowing the decline in South Asia's vultures

Toby H Galligan (RSPB), Richard J Cuthbert (RSPB), Rhys E Green (RSPB Conservation Science Group University of Cambridge)

Diclofenac caused unprecedented declines in South Asia's vultures. Conservation action led to bans on diclofenac and promotion of a safe alternative. Surveys show a reduction in diclofenac availability and prevalence; and a slowing of declines among species and countries. However, species rarity means that decline rates are necessarily imprecise. Conservation efforts must continue to assure species recover.

10:00 Wednesday 19th December 2012

42.22

Temporal and spatial trends in UK freshwater pollutants revealed by a sentinel species

Eleanor F Kean (Cardiff University), Elizabeth A Chadwick (Cardiff University)

A 20 year national screening programme has revealed that nine of thirteen persistent organic pollutants (POPs) have declined significantly in otters, but levels remain higher in the east than the west. Bioaccumulation of POPs has health implications for a wide range of biota, and otters are a valuable sentinel species.

10:15 Wednesday 19th December 2012

42.23

The Recovery of *Polyommatus bellargus* in the UK: Conservation Management, not Climate Change, is the Driver.

Rory S O'Connor (The Centre for Ecology and Hydrology), Jeremy A Thomas (Oxford University), Rosemary S Hails (The Centre For Ecology and Hydrology)

It has been suggested that climatic warming has facilitated the recent recovery of *Polyommatus bellargus* (the Adonis Blue butterfly) in the UK, by relaxing the thermal constraints on its larval niche. However, results show that habitat preferences have not altered, but conservation action has made the turf structure of grassland sites more favourable to *P. bellargus*.

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42.24

To see or not to see: considering detectability in the design of Ganges River Dolphin monitoring

Nadia I Richman (Institute of Zoology Zoological Society of London), Julia PG Jones (Bangor University), Samuel Turvey (Institute of Zoology Zoological Society of London), Tomonari Akamatsu (National Research Institute of Fisheries Engineering Fisheries Research Agency Japan)

Detecting trends in population size is reliant on accurate and precise monitoring methods. This study investigates the accuracy of Ganges River Dolphin abundance estimates obtained during visual boat-based surveys. Using a simultaneous acoustic survey, it has been possible to investigate the factors that affect detection of dolphins during visual surveys and make recommendations to improve accuracy during future surveys.

12:00 Wednesday 19th December 2012

42.25

Tropical grassy biomes: threats, challenges and conservation

Catherine L Parr (University of Liverpool), Caroline E.R. Lehmann (Macquarie University), William A. Hoffmann (University of North Carolina), William J. Bond (University of Cape Town), Alan N. Andersen (CSIRO)

Tropical grassy biomes receive much less attention than tropical forests. We explore the current threats to tropical grassy biomes through a consideration of the unique defining characteristics of these systems, examine the potential for perverse outcomes in the application of REDD+ to grassy biomes, relate this to the perennial issue of biome definition and discuss specific conservation challenges.

12:15 Wednesday 19th December 2012

42.26

Use of coir rolls for habitat enhancement of urban river walls

Simon PG Hoggart (University of Plymouth), Robert A Francis (King's College London)

Coir-rolls were used to trap seeds along flood defence walls of a large tidal urban river. The plant diversity of deposited seeds was higher than that found on the walls. There was limited similarity between seeds deposited and wall flora. Seed deposition was affected by trap position and traffic. Results show there is potential to improve urban river plant diversity.

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42.27

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The slender lorises (LORICIDAE: Loris) of Sri Lanka - creating a conservation blueprint.

Craig Turner (ZSL), Saman Gamage (University of Colombo), James Reardon (Department of Conservation New Zealand), Sarath Kotagama (University of Colombo), Kalinga Padmalal (Open University of Sri Lanka)

The slender lorises are relatively unknown nocturnal primates, of the threatened forests of Sri Lanka. The Zoological Society of London engaged has worked with the University of Colombo and the Open University of Sri Lanka, to bring research and conservation focus to this species and its habitat. Here we illustrate how this work is informing a national conservation blueprint.

12:45 Wednesday 19th December 2012

BIOGEOGRAPHY AND ECOLOGY

06.1

Specialized interactions and evolutionary history as drivers of rarity in plant species

Ryan D Phillips (The Australian National University), Celeste C Linde (The Australian National University), Rod Peakall (The Australian National University), Kingsley W Dixon (Kings Park and Botanic Garden), Stephen D Hopper (University of Western Australia)

In a genus wide study of *Drakaea* (Orchidaceae) we examined the role of pollinator and mycorrhizal availability in species rarity in a phylogenetic context. While the availability of specific mycorrhizal fungi was not limiting, low pollinator availability was correlated with species rarity. We propose that specific pollination systems may lead to rapid speciation and a higher likelihood of species rarity.

15:00 Tuesday 18th December 2012

06.2

Experiments on the use of inert pads to study the arthropods of suspended soils

Peter Shaw (University of Roehampton)

I report experiments where cheap, permeable pads are inserted into tree holes as a soil. They are removed to a Tullgren apparatus to extract the arthropods. Both plastic and metal pads were readily colonised by both arboreal and soil-associated Collembola. This is a minimally invasive technique that could be widely used to monitor arthropod

communities (eg. in caves).

15:15 Tuesday 18th December 2012

06.3

Geothermal ecosystems as platforms for testing ecological theories

Jon S Olafsson (Institute of Freshwater Fisheries)

Due to its volcanic activity, Iceland has a vast number of geothermally affected ecosystems. Such systems offer unique scenarios for investigating ecological and evolutionary processes which may be linked to the possible effects of climate changes. Some of these systems harbour communities which form ecological “islands” which have proved to be excellent systems testing meta-community theories.

15:30 Tuesday 18th December 2012

06.4

Ladybirds in a changing world: Ecological correlates of distribution trends in the British Coccinellidae.

Richard F Comont (CEH), Helen E Roy (CEH), Owen T Lewis (University of Oxford), Richard Harrington (Rothamsted Research), Chris R Shortall (Rothamsted Research), Beth V Purse (CEH)

We investigated the effects on ladybirds of climate and habitat factors, species-level traits and niche overlap with the invasive non-native species *Harmonia axyridis*, on local-scale extinction and colonisation dynamics across mainland Britain. Several factors were significant, including habitat, climate & trait factors, but the strongest relationship was between extinction and niche overlap with *H. axyridis*.

15:45 Tuesday 18th December 2012

06.5

Temperature requirements of pollen germination control species' altitudinal distribution

Sergey Rosbakh (University of Regensburg), Peter Poschlod (University of Regensburg)

Cardinal temperatures of pollen germination and pollen tube growth were estimated for 26 species with different altitudinal ranges. Initial temperatures of both processes were found to be strongly negatively correlated to altitude. Increasing negative temperature stress along an altitudinal gradient may, therefore, limit upward distribution of species with high temperature requirements of the progamic phase.

16:00 Tuesday 18th December 2012

06.6

The effects of ecological restoration on CO₂ fluxes from a climatically marginal upland blanket bog

Simon D Dixon (Durham University), Suzane M Qassim (Durham University), James G Rowson (Manchester Metropolitan University), Fred Worrall (Durham University), Martin Evans (Manchester University)

The presentation will examine the results of a five-year, multi-site, observational study of restoration interventions (revegetation and slope-stabilisation) made to areas of bare peat on the Bleaklow Plateau, Peak District. Bare and 'least-disturbed' sites are used as comparitors. The key finding is that: sites with slope stabilisation are most successfully revegetated and revegetation reduces net loss of CO₂.

16:15 Tuesday 18th December 2012

06.7

What, where and when: addressing the issues surrounding maximum entropy modelling of UK fungal distributions.

Kirsty K Monk (Plant Sciences Department Oxford), David Bass (Natural History Museum London), Nick D Brown (Linacre College Oxford), Gabriel E Hemery (Silva Foundation), Isabel Fenton (Imperial College London)

Maximum entropy modelling has been used to generate environmental envelope models based on historic foray data. These were tested in the face of issues such as the sporadic nature of fungal fruiting, uneven sampling effort in space, and uncertainty surrounding the functional importance of the character being modelled, for their validity and suitability as baseline distribution maps for UK fungi.

16:30 Tuesday 18th December 2012

06.8

Niche Evolution in South American Trees

Kyle G Dexter (Royal Botanic Garden Edinburgh University of Leeds), Timothy Baker (University of Leeds), Oliver Phillips (University of Leeds), Ary Oliveira-Filho (Universidade Federal de Minas Gerais), Jerome Chave (Centre National de la Recherche Scientifique), Toby Pennington (Royal Botanic Garden Edinburgh)

We present preliminary results from an on-going investigation into niche evolution of South American trees. We leverage a unified network of tree plots spread across lowland tropical South America in combination with a genus-level phylogeny covering all taxa and a species-level phylogeny for Leguminosae to examine patterns of climatic and edaphic niche evolution.

16:45 Tuesday 18th December 2012

**THEMATIC TOPIC: ECOLOGICAL EFFECTS OF NITROGEN DEPOSITION
ON ARCTIC AND ALPINE ECOSYSTEMS**

TT1.1

Interactive effects of climate change and nitrogen deposition in mountain environments

Jill S Baron (US Geological Survey), Alex Wolfe (University of Alberta), Ed K Hall (US Geological Survey), Sarah Spaulding (US Geological Survey), William D Bowman (University of Colorado), Andrew Fountain (Portland State University)

Atmospheric nitrogen deposition alters the biogeochemistry, microbial activity, productivity and biodiversity of alpine freshwaters and vegetation of the US Rocky Mountains. Now, with record high temperatures, longer snow-free seasons, and retreating glaciers, climate X N interactions stimulate some freshwater biota while depressing some alpine plant species. Global change is reorganizing alpine species assemblages and altering ecosystem processes.

09:00 Wednesday 19th December 2012

TT1.2

Climate and nitrogen drive the ecological change of two remote alpine lakes in southeast margin of Tibetan

Suzanne McGowan (University of Nottingham), N John Anderson (Loughborough University), Zhujun Hu (Nanjing Institute of Geography and Limnology), Xiangdong Yang (Nanjing Institute of Geography and Limnology), Enlou Zhang (Nanjing Institute of Geography and Limnology)

The relative roles of climate and nitrogen deposition in driving recent ecological change in alpine lakes are unclear. Here we report a 200-year multiproxy palaeolimnological study of two remote, oligotrophic alpine lakes located in the Southeast margin of Tibet, an area sensitive to climate change and located within the Southeast-Asian hot spot for reactive nitrogen emission.

09:30 Wednesday 19th December 2012

TT1.3

The effect of long range atmospheric nitrogen deposition on nutrient limitation of phytoplankton growth in lakes in South West Greenland

Erika J Hogan (Loughborough University), Suzanne McGowan (University of Nottingham),

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N John Anderson (Loughborough University)

The effect of atmospheric nitrogen deposition on phytoplankton nutrient limitation was investigated along a gradient of precipitation in SW Greenland. Phytoplankton growth was measured over 14 days following one of six nutrient treatments. A clear response to nutrient supply was found in 95 % of bioassays. Strong seasonal variation was observed, shifting from P-limitation under ice to co-limitation in summer.

09:45 Wednesday 19th December 2012

TT1.4

Persistent effects of nitrogen deposition on high Arctic tundra vegetation and carbon stocks

Sarah Woodin (University of Aberdeen), Lorna Street (Bangor University)

Two decades after application of nitrogen to tundra, effects are still apparent in plant community composition and plant and soil carbon stocks. Nitrogen addition alone resulted in a halving of carbon stocks, seemingly due to increased decomposition. Where phosphorus was also added, carbon stocks have doubled due to increased moss productivity.

10:00 Wednesday 19th December 2012

TT1.5

Recovery of N from short-term extreme and long-term chronic deposition events in the high Arctic tundra: Time matters

Sonal Choudhary (University of Sheffield), Aimeric Blaud (University of Sheffield), Mark Osborn (University of Hull), Malcom C Press (University of Birmingham), Andrew M Tye (British Geological Survey), Gareth K Phoenix (University of Sheffield)

Arctic ecosystems are threatened by pollution from both chronic and acute, extreme atmospheric N depositions. Here we report the difference in N (^{15}N) recovery from the first-ever field simulation of extreme N deposition events (short-term) and snowpack chronic N deposition after 10-years (long-term), within the plant-soil system in the high arctic tundra.

10:15 Wednesday 19th December 2012

TT1.6

Determining ecological effects of N-deposition in remote lakes using stable isotopes

Gavin L Simpson (UCL)

Many nutrient poor fresh waters are nitrogen (N) limited and, in areas that have received

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enhanced levels of N deposition, lakes may have switched from N to P limitation. Stable isotopes measurements of lake sediments provide a long-term record of biogeochemical change. Here I present results from UK upland lakes that suggest N deposition is causing enrichment.

10:30 Wednesday 19th December 2012

THEMATIC TOPIC: DELIVERING SUSTAINABLE AGRICULTURE IN THE UK - PROMOTING DIALOGUE BETWEEN ECOLOGISTS AND ECONOMISTS

TT3.1

Delivering sustainability

Nick Hanley (University of Stirling)

What is a "sustainable" agricultural system? I review economists' definitions of sustainability, what rules might promote or guarantee sustainability, and how sustainability can be tested for. I then consider how these ideas apply to individual sectors and ecosystem types; focusing on what we are trying to sustain over time, and the role of maintaining capital compared to technological progress.

09:00 Wednesday 19th December 2012

TT3.2

Reconciling farming and nature conservation: questions, answers, and next steps

Andrew Balmford (University of Cambridge), Rhys Green (RSPB University of Cambridge), Rhys Green (RSPB University of Cambridge), Ben Phalan (University of Cambridge), Ben Phalan (University of Cambridge)

Is it better to adopt wildlife-friendly on-farm practices (land sharing), or maximise farm yields and spare other land for conservation (land sparing)? A model, parameterised in Ghana and India, suggests that in both areas, all taxa examined would fare better under land sparing. We will next extend this work to Europe and to exploring ways of incentivising land sparing.

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TT3.3

Incentivising biodiversity conservation on farmland

Frank Wätzold (Brandenburgische Technische Universität Cottbus), Martin Drechsler (Helmholtz Centre for Environmental Research - UFZ)

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Incentives for biodiversity conservation on farmland arise in Europe mainly through agri-environmental schemes. Using examples it will be shown that the integration of ecological and economic knowledge in models is a suitable approach to design agri-environmental schemes in a way that they are more effective (conservation goals are actually achieved) and cost-effective (conservation goals are maximised for available financial resources).

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TT3.4

Integrating biodiversity and ecosystem services into agricultural production - a challenge for the CAP

Allan Buckwell (Institute for European Environmental Policy)

Farmers provide provisioning ecosystem services primarily responding to market signals. They also under-provide regulating, supporting and cultural ecosystem services because these are subject to market failures. Farming often degrades biodiversity, and causes water, soil and atmospheric pollution. The CAP is evolving to incentivise farmers to reduce negative environmental effects and increase provision of public goods. The policy measures are clumsy.

10:00 Wednesday 19th December 2012

TT3.5

Co-viability of farmland biodiversity and agriculture

Lauriane Mouysset (University of Cambridge), Luc Doyen (French National Museum - National Center of Scientific Research), Frédéric Jiguet (French National Museum)

Declines of farmland biodiversity question the reconciliation between agriculture and biodiversity conservation. Based on a co-viability approach, we evaluated bio-economic risks of public policies through the probability of satisfying biodiversity and economic constraints throughout time. We highlighted a viable kernel of public policies with tolerable agro-ecological risk. The flexibility and multi-criteria viewpoint underlying this approach appear fruitful for adaptive management.

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TT3.6

Designing Incentive Schemes at the Landscape Scale.

Alessandro Gimona (The James Hutton Institute), Gary Polhill (The James Hutton Institute), Luz-Maria Lozada-Ellison (The James Hutton Institute)

We report results from interviews, behavioural games and a coupled agent-based model of land use change and species metacommunity dynamics. The results suggest that critical

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thresholds in incentive schemes might exist. The importance of trust building institutions was also highlighted. It might be challenging for simple economic models to cope with the complexity of real socio-ecosystems.

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TT3.7

Can Ecosystem Services Help Build Resilience into Agriculture?

Line Gordon (Stockholm Resilience Centre)

Agriculture increases food production, but often at the expense of other ecosystem services. I present empirical and conceptual knowledge, primarily from drylands, of how synergies among ecosystem services can improve food security, overall resilience, and economic benefits for poor communities. Using an "agroecosystem" landscape approach can help identify both synergies and trade-offs among ecosystem services and different beneficiaries.

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TT3.8

On the value of Agricultural Biodiversity

Salvatore Di Falco (University of Geneva)

Biodiversity is important for both the functioning of ecological systems and the generation of ecosystem services. This article explores recent contributions to the economics of agrobiodiversity. Both theoretical and empirical applications are reviewed and assessed. Of special interest is its relationship to agroecosystem services and resilience. Future issues are also highlighted.

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TT3.9

Human behaviour, ecosystem services and the resilience of agri-ecosystems

E.J. Milner-Gulland (Imperial College)

Conservationists are increasingly using incentive-based approaches to promote biodiversity conservation in multiple use landscapes under weak governance. Using a case study from Cambodia, I reflect upon the factors affecting intervention success, both for biodiversity and wellbeing outcomes, and what lessons might be transferable to improving agricultural sustainability in the UK.

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TT3.10

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Development for ecosystem services

Andrew P Whitmore (Rothamsted Research)

Foresight suggested that sustainability would be best served by aligning environmental and market incentives. Many ecosystem services such as water capture that farming delivers are effectively free. Given reluctance to pay for something that is now free, the key to accessing payment for ES is technological improvement that delivers an increase in environmental service without impact on crop production.

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TT3.11

Sustainable agricultural intensification: is it possible to have it all?

Dominic Moran (SAC)

This talk will outline some of the choices implied by an agenda of sustainable agricultural (SI) intensification, outlining the trade-offs that define the currently polarised positions on inter alia GM technologies, climate change and meat consumption among a fast-growing global population. The SI debate shows that having it all may not be possible.

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THEMATIC TOPIC: THINKING INSIDE THE BOX - POPULATION AND COMMUNITY CONSEQUENCES OF ONTOGENETIC DEVELOPMENT TT6.1

Ontogenetic development and population and community dynamics: Introduction

Lennart - Persson (Department of Ecology and Environmental Sciences Umeå university)

Ontogenetic development characterizes the life history of all organisms on Earth. The different kinds of individual growth patterns observed in different organisms are reviewed, and an overview is given of the possible consequences of ontogenetic development on population and community dynamics. Finally, the question whether a general ecological theory taking ontogenetic development into account may be reached is addressed.

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TT6.2

Thinking inside the box: community-level consequences of stage-structured populations

Volker H.W. Rudolf (Rice University)

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Community ecology has traditionally treated species as homogenous entities and thereby implicitly assumed that individuals within species are functionally equivalent. Yet, increasing evidence indicates that developmental stages can differ substantially in their ecological interactions. Recent work indicates that these ontogenetic shifts are ubiquitous in natural communities and can fundamentally alter the structure and dynamics of communities and ecosystem processes.

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TT6.3

Ontogenetic symmetry breaking in ecological systems

André M. De Roos (University of Amsterdam The Netherlands), Lennart Persson (Umeå University Sweden)

Community theory currently ignores ontogenetic development, even though it characterizes the life history of all species. Development, in particular growth in body size, leads to ontogenetic asymmetry in energetics between differently sized individuals. We discuss the community consequences of such ontogenetic asymmetry, illustrating how it overturns basic ecological principles by inducing population size structure to change with changing environmental conditions.

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TT6.4

Ecoevolutionary dynamics in size-structured populations

William A Nelson (Queen's University)

Previous work has shown that structured dynamics can influence selection among asexual genotypes in consumer-resource systems. One question raised by this work is how to characterize the variation and covariation among life-history traits for novel genotypes. Here I present experimental results in freshwater zooplankton that suggest an energy budget model to capture this life-history trait (co)variation.

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TT6.5

Interference vs. Exploitative Competition in Size-Structured Populations

Vincent Le Bourlot (Laboratoire Ecologie et Evolution CNRS UMR 7625 Université Pierre et Marie Curie), Thomas Tully (Laboratoire Ecologie et Evolution CNRS UMR 7625 Ecole Normale Supérieure Paris), Romain Perronet (Laboratoire Ecologie et Evolution CNRS UMR 7625 Université Pierre et Marie Curie), David Claessen (Laboratoire Ecologie et Evolution CNRS UMR 7625 Ecole Normale Supérieure Paris)

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Intraspecific interference competition gives a competitive advantage to larger individuals through social interactions (as opposed to exploitative competition which usually favours small individuals). We show how interference competition first dampens juvenile-driven generation cycles and then leads to the emergence of giant individuals and high amplitude cycles, using both experiments and a size-structured model.

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TT6.6

Complex interactions between different phenotypic plastic responses affect larval performance in a marine invertebrate

Luis Gimenez (School of Ocean Sciences Bangor University), Enrique Gonzalez-Ortegon (School of Ocean Sciences Bangor University)

We study interactive effects of different types of phenotypic plastic responses on the successful development of early stages of organisms. In marine shrimps, thermal and food-dependent maternal effects and larval developmental plasticity interact and determine patterns of pelagic larval duration (PLD). PLD is a trait that affects dispersal, survival and recruitment in marine species with complex life cycles.

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TT6.7

Biomass overcompensation revealed by long-term time series data

Jan Ohlberger (CEES University of Oslo Norway), Øystein Langangen (CEES University of Oslo Norway), Eric Edeline (UPMC-Paris6 UMR 7618 France), David Claessen (Ecole Normale Supérieure UMR 7625 Paris France), Ian J Winfield (Centre for Ecology and Hydrology Lancaster UK), Nils C Stenseth (CEES University of Oslo Norway), Asbjørn Vøllestad (CEES University of Oslo Norway)

Using time-series analysis and stage-structured population models, we show that biomass overcompensation by juveniles occurred in a natural fish population in response to increased adult mortality induced by a severe pathogen outbreak. The compensatory response occurs due to release from competition among adults leading to higher age-specific fecundity and reproduction, and release from cannibalism leading to higher juvenile survival.

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TT6.8

Spill-over effects and source/sink habitat status are stage-specific in size-structured metapopulations.

Arne Schröder (University of Sheffield), Esther Maier (University of Sheffield), Tim Benton (University of Leeds)

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Stage- and spatial structure have major consequences for populations but their interaction is unexplored. We manipulated stage-structure in closed and open habitats using egg mortality. In open populations, stage-specific spill-over effects in opposite directions compensated the negative mortality effect on juveniles and increased adult densities in unharvested reserves. Habitat status as a source or sink therefore depended on life-history stage.

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TT6.9

Size-dependent traits and the resilience of marine populations and communities

Julia L Blanchard (University of Sheffield)

The properties of marine communities, and the traits of populations nested within them, can affect how resilient they are to human induced and environmental change. The goal of this paper is to explore ideas that link the role of size-dependent traits with community resilience, including testing theoretical predictions with empirical data from a wide range of marine ecosystems.

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TT6.10

Dealing with death. How different mortality scenarios impact predators with complex life history in a size-structured community

Anieke Van Leeuwen (University of Amsterdam), André M De Roos (University of Amsterdam)

The mystery posed by the lack of recovery after marine predator population collapses has evoked many hypotheses to explain this phenomenon. Fisheries impact complex ecological systems, formed by the integrated dynamics at small scales. By the analysis of size-structured predator-prey models we test some postulated explanations for the lack of recovery of marine predator populations, starting from individual level processes.

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TT6.11

Does habitat structure promote coexistence in a size-structured intraguild predation system?

Birte Reichstein (Umeå University), Arne Schröder (Lund University), Lennart Persson (Umeå University), André M De Roos (University of Amsterdam)

Habitat complexity has been suggested to promote the persistence of intraguild predation (IGP) systems through weakening trophic interactions particularly the predation link. Here

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we show that, in a size-structured IGP system, the presence of habitat structure does not promote the coexistence of IG-predator and IG-prey despite a major decrease in the IG-predator's capture rate.

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TT6.12

Ontogenetic diet shifts in a shared predator promote coexistence of competing prey

Sabine Wollrab (Ludwig-Maximilians Universität München Germany), Andr^é M. De Roos (University of Amsterdam The Netherlands), Sebastian Diehl (Umea University Sweden)

Theory on predator-mediated coexistence has so far ignored the role of stage structure at the predator level. We show that ontogenetic diet shifts at the predator level have a high potential to enlarge coexistence between competing prey along a productivity gradient. Furthermore only a slight niche shift is necessary to lead to qualitatively different patterns compared to the unstructured case.

13:00 Wednesday 19th December 2012

AQUATIC ECOLOGY

03.1

Changes in functional attributes of stream macroinvertebrate communities during landscape evolution over 220 years.

Alexander M Milner (University of Birmingham), Anne E Robertson (University of Roehampton), Lee E Brown (University of Leeds)

Clear trends in the biotic traits of macroinvertebrates were evident over time, especially dispersal abilities, adult ability to exit the water, body shape and body size. These trends have been used to inform a conceptual model of the filters that act at different stages of stream development to limit colonization from the regional species pool of macroinvertebrates.

09:00 Wednesday 19th December 2012

03.2

Changes in the ecology of West Greenland lakes over recent centuries

Vivienne J Jones (University College London), Suzanne McGowan (University of Nottingham), Erika J Hogan (Loughborough University), N John Anderson (Loughborough University), Chris Curtis (University of the Witwatersrand), Laurence RB Evans (University College London), Jan Kaiser (University of East Anglia), Antonia C Liversidge (Loughborough University), Jenny Warhurst (University of Southampton)

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Lake sediment cores from around Kangerlussuaq in West Greenland were sampled over a precipitation gradient to test whether nitrogen deposition has influenced recent limnological change. Biological and chemical change inferred from algal pigments, diatom and stable isotopes was greatest after AD1950 in lakes receiving higher nitrogen deposition loads and located in non-vegetated catchments.

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03.3

A new carbon source in riverine food webs?

Aurora Sampson (Queen Mary University), Alan G Hildrew (Queen Mary University), Jonathan Grey (Queen Mary University), Guy Woodward (Queen Mary University)

Methane is a largely unknown carbon source in running waters, but recent stable isotope analysis has suggested some chalk-stream invertebrates such as cased caddis (Trichoptera) consume methane-derived carbon. As dominant primary consumers, the potential for trophic transfer of methane-derived carbon is considerable. We provide new, comprehensive evidence that methane-fuelled riverine food webs are far more widespread than previously thought.

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03.4

Bridging behaviour, conservation and fishery management: a salmonid individual-based model

Sui C Phang (Bournemouth University), Richard A Stillman (Bournemouth University), Robert J Britton (Bournemouth University), Dylan Roberts (Game and Wildlife Conservation Trust), Rudy E Gozlan (Bournemouth University)

Animals adapt their behaviour to changes in the environment and yet integration of behavioural ecology in conservation management is uncommon. Understanding behavioural responses to an environmental change and predicting resulting effects on population characteristics will assist in designing optimal management strategies. Here we use an individual-based model to investigate the impact of flow, weed-cutting and predator management on salmonid populations.

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03.5

Drivers of nutrient uptake in High Arctic rivers (Svalbard) under a changing climate

Phillip J Blaen (University of Birmingham), Alexander M Milner (University of Birmingham), David M Hannah (University of Birmingham), Lee E Brown (University of Leeds)

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Nutrient uptake was quantified in 12 Svalbard rivers. Demand for NO_3^- and PO_4^- was low, but demand for NH_4^+ was high and associated positively with water temperature, algal biomass and transient storage zone area. Uptake of NH_4^+ increased when added with acetate, suggesting NH_4^+ assimilation by microbial communities is mediated by labile DOC availability in these Arctic river systems.

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03.6

Effect of flow, host size and parasitism on fish behaviour

Fran A Hockley (Cardiff University), Alex Brew (Cardiff University), Nathalie Graham (Cardiff University), Catherine AME Wilson (Cardiff University), Joanne Cable (Cardiff University)

Swimming and shoaling behaviour of parasite-infected guppies was investigated using an open channel flume. At an individual level, localised flow velocities and host size altered swimming behaviour, specifically refuge use and rate of movement. At the population level, both an increase in flow rate and parasite infection reduced shoaling behaviour.

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03.7

How low can you go? The impacts of low flows on the chalk stream macrophyte *Ranunculus pseudofluitans*

Alexander JW Poynter (University of Birmingham), Lesley C Batty (University of Birmingham), Mark E Ledger (University of Birmingham), John Bridgeman (University of Birmingham), Shirley Medgett (Environment Agency)

The keystone macrophyte *R. pseudofluitans* is well-known as a biological engineer in chalk streams, often controlling community assemblage. Threatened by climate change and drought, little is known about the responses of this important macrophyte to low-flow conditions. Under experimental conditions, flow was found to be critically important in determining plant morphological trait and physiological stress responses.

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03.8

Investigating the ecological impacts of sewer misconnections using diatom communities.

David M Chandler (University of Sheffield), David N Lerner (University of Sheffield), Philip H Warren (University of Sheffield)

Sewer misconnections connect domestic appliances to surface water sewers, causing intermittent release of domestic sewage directly to rivers. There has been very little study

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of the ecological impacts of misconnection discharge to date, despite the potential threat it poses to surface water ecosystems. In this study, diatom communities have been used as ecological indicators to investigate the impact of misconnections.

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03.9

Interannual variation in stream flow drives changes in the functional potential of floodplain invertebrate communities.

Matt J O'Callaghan (University of Birmingham), David M Hannah (University of Birmingham), Adam J Bates (University of Birmingham), Sarah Henshall (Buglife), Jon P Sadler (University of Birmingham)

We used a long-term dataset of invertebrates and river discharge data to explore functional diversity in floodplains. A vector for transferring aquatic nutrients, invertebrates represent a key functional floodplain component. Interannual community responses to flood-driven disturbance indicate that climate change induced flow variability may have a significant impact on cross-ecotone exchanges.

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03.10

Landscape structure and community diversity influence colonization patterns in experimental metacommunities

Mathew Seymour (EawagETH), Florian Altermatt (Eawag)

Recent theoretical studies suggest dendritic networks alter dispersal and species interactions compared to more traditional linear or homogenous landscape views. We investigated landscape structure and community diversity influences on colonization patterns of six protist and a rotifer species using silicon tubing experiments, allowing for active dispersal. Our findings suggest landscape geometry, species traits, and species interactions significantly influence colonization patterns.

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03.11

Pilot Catchments to improve Ecological Status under WFD - will they work?

David M Harper (University of Leicester), Peter Barham (Welland Rivers Trust), Liz Jameson (Welland Rivers Trust), Chris Stoate (Game Wildlife Conservation Trust)

The Welland is one of 10 "Pilot Catchment" projects set up in 2011 to produce a rapid improvement in Ecological Status of rivers through partnership between the Environment Agency and non-statutory bodies. Managed by the Welland Rivers Trust, under the umbrella of the Welland Valley Partnership, will it achieve this? If so, can lessons learnt be

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transferred?

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03.12

Predation alters macroinvertebrate community structure and function in alpine stream mesocosms.

Kieran Khamis (University of Birmingham), Alexander Milner (University of Birmingham), Lee Brown (University of Leeds), David Hannah (University of Birmingham)

Stonefly predators are predicted to increase their range in alpine stream systems with climate change. Using streamside mesocosm channels, we found that stonefly predation reduced algal grazer abundance and increased trophic height. Community size structure was also positively skewed. These results suggest that predator range expansion in alpine streams will alter biotic interactions, ecosystem function and ultimately increase extinction risks.

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03.13

The effects of ecological restoration, on water table depths and soil-pore water DOC concentrations, on an upland blanket bog.

Suzane M Qassim (Durham University), Simon D Dixon (Durham University), James Rowson (Manchester Metropolitan University), Fred Worrall (Durham University), Martin Evans (University of Manchester)

The data were gathered monthly between 2006 to 2012 from sites on the Bleaklow Plateau, Peak District. Samples were collected from restoration and control (bare and vegetated) sites. Treatment of bare peat significantly affected DOC concentrations over time. There does not appear to be a simple relationship between bare site re-vegetation and DOC.

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03.14

The fate of in-stream carbon

Catherine S Moody (University of Durham), Fred Worrall (University of Durham)

This talk presents a series of 70 hour experiments investigating rates of photo- and bio-degradation of organic carbon to CO₂ in surface-waters draining a peat-dominated upland-catchment in the North Pennines. Findings suggest that up to 60% of DOC and 50% of the suspended-sediment is lost in the 70 hours. These findings will help improve the accuracy of peatland carbon budgets.

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03.15

Trophic consequences of adapting river systems to climate change.

Stephen M Thomas (Cardiff University), Sian W Griffiths (Cardiff University), Steve J Ormerod (Cardiff University)

Restoration of riparian tree cover is currently recognised as a potential climate change adaptation for stream ecosystems. Whilst the thermal consequences of such strategies are well quantified, effects on community-level trophic interactions, and how these may ultimately affect fish production, are poorly understood. This study investigated effects of restoration on macroinvertebrate trophic dynamics and Salmonid populations in upland streams.

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BIODIVERSITY AND ECOSYSTEM FUNCTION

04.1

Aperiodic marine benthic anoxia in the Late Jurassic I: A method for assessing palaeoecological functioning

Chris Frid (University of Liverpool), Bryony A Caswell (University of Liverpool)

De-oxygenation in marine ecosystems is increasing as a result of anthropogenic eutrophication and climatic change. Over an 8 million year period, in the Kimmeridgian, shelf seas experienced fluctuating anoxia. We develop a Biological Traits Approach to describe functioning of the 21 fossil assemblages (dominated by bivalves and contained gastropods, brachiopods, scaphopods, bryozoans, serpulids, hydroids and crustaceans) recorded during this period.

09:00 Wednesday 19th December 2012

04.2

Aperiodic marine benthic anoxia in the Late Jurassic II: Eight million years of changing palaeoecological functioning

Bryony A Caswell (University of Liverpool), Chris Frid (University of Liverpool)

Ancient hypoxia can provide a useful analogue to facilitate our understanding of current and future long-term marine de-oxygenation. Biological Traits Analysis of 21 palaeocommunities showed that changes in benthic functioning occurred during differing levels of hypoxia in UK shelf seas in the Kimmeridgian (~150 million years ago). These changes were primarily driven by changes in redox state and primary production.

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04.3

Restoring *Sphagnum* in the Southern Pennines

Angus E Rosenburgh (Manchester Metropolitan University), Simon J M Caporn (Manchester Metropolitan University), Neal Wright (Micropropagation Services Ltd.), Matt Buckler (Moors for the Future Partnership)

The blanket bogs of the Southern Pennines have suffered a history of atmospheric pollution and poor land management, resulting in the near-extinction of *Sphagnum* mosses. Amid on-going restoration, *Sphagnum* re-introduction trials have been established to answer fundamental questions; how, where, when and what. Here, we present the latest results of these experiments.

09:30 Wednesday 19th December 2012

04.4

The Benefit of Biodiversity for Biomass Production: Insights from a Grassland Model

Franziska Taubert (Helmholtz Centre for Environmental Research - UFZ), Karin Frank (Helmholtz Centre for Environmental Research - UFZ), Andreas Huth (Helmholtz Centre for Environmental Research - UFZ)

Multi-species grasslands have been discussed as an interesting option for biomass production. Experiments showed the positive effect of species-richness on ecosystem functions of temperate grassland mixtures. Using the newly developed, individual-based grassland model GRASSMIND, we investigate the influence of biodiversity on biomass yield and carbon balance for different management strategies.

09:45 Wednesday 19th December 2012

04.5

BiodivERsA - Promoting the pan-European dimension of biodiversity research

Xavier Le Roux (FRB Paris France), Hilde Eggermont (BELSPO Brussels Belgium), Maurice Héral (ANR Paris France), Coenraad Krijger (NWO The Hague The Netherlands), Henrik Lange (FORMAS Stockholm Sweden), Frédéric Lemaitre (FRB Paris France), Sonia Mendes da Silva (FCT Lisbon Portugal), F.I. Pugnaire (CSIC Almeria Spain), Wolfgang W. Weisser (DFG Jena Germany)

BiodivERsA is a network of 21 funding agencies across 15 countries promoting transnational cooperation of biodiversity research teams across Europe. Since 2008, it has allocated ~30M€ through annual joint calls. We will present an overview of the projects supported by BiodivERsA, their scientific novelty and European added value, and how

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they bridge the gap between scientific knowledge and societal needs.

10:00 Wednesday 19th December 2012

04.6

Colonisation of invertebrates as influenced by biological substrate and a history of copper contamination

David J McElroy (University of Sydney), Dieter F Hochuli (University of Sydney), Ross A Coleman (University of Sydney)

Temporal contingencies are often assumed to be important, yet remain largely under-examined for many ecological systems. We investigated the effect of copper contamination on marine biofilm development and the subsequent settlement of macro-invertebrates. Early results suggest that macro-invertebrate succession is influenced by an interaction between biofilm composition and copper toxicity.

10:15 Wednesday 19th December 2012

04.7

Land use intensity and ecosystem multifunctionality

Eric Allan (University of Bern), Oliver Bossdorf (University of Bern), Markus Fischer (University of Bern)

We analyse the effect of land use intensification on ecosystem multifunctionality, using around 30 measures of ecosystem function and services collected from 150 grasslands, data come from the German Biodiversity Exploratories project. We investigate overall effects of land use intensity on multifunctionality and also identify synergies and trade-offs between different functions and between biodiversity and functioning.

10:30 Wednesday 19th December 2012

04.8

Plant life forms in contrasting climatic zones of Libya

Tarek A. Mukassabi (University of Benghazi), Gousn Ahmidat (Sebha University), Imhamed M. Sherif (Benghazi University), Abdusslam Elmogasapi (Benghazi University), Peter A. Thomas (Keele University)

Areas near the Mediterranean have a high species diversity, mostly therophytes with many medicinal species. Their zonation from the sea is clearly affected by climate. This contrasts with the Sahara which has fewer species but more specialists in using groundwater. Three new record species for Libya were found in the Saharan site.

10:45 Wednesday 19th December 2012

04.9

How grassland diversity restoration promotes soil carbon sequestration and other ecosystem functions

Gerlinde B. De Deyn (Wageningen University), Richard D. Bardgett (Lancaster University), Helen Quirk (Lancaster University), Nick J. Ostle (CEH Lancaster), Simon Oakley (CEH Lancaster), Niall P. McNamara (CEH Lancaster), Robert S. Shiel (Newcastle University), Christopher Freeman (University of Wales Bangor), Nathalie Fenner (University of Wales Bangor), Iain Young (University of New England Australia)

In this study we test whether biodiversity restoration management can also promote soil based ecosystem functions. We determined the accumulation rates of C and N in soil, enzyme activities and soil structure changes in a field experiment in relation to grassland management, productivity and composition. Plant diversity restoration management showed a strong impact on the soil based ecosystem services.

11:45 Wednesday 19th December 2012

04.10

Which functional component of biodiversity drives ecosystem processes? The dominant traits or trait dissimilarity in the community?

Marco Moretti (Swiss Federal Research Institute WSL), Francesco De Bello (Institute of Botany Czech Academy of Sciences), Karolína Bíla (Swiss Federal Research Institute WSL + Global Change Research Centre AS CR), André T.C. Dias (VU University Amsterdam), Gianni B. Pezzatti (Swiss Federal Research Institute WSL), Raoul Van Oosten (VU University Amsterdam), Matty P. Berg (VU University Amsterdam)

It is crucial to know which component of biodiversity drives ecosystem functions and services. We tested the relative importance of dominant traits (Mass ratio hypothesis) versus trait dissimilarity (Complementary hypothesis) in driving decomposition in a microcosm experiment with isopod community as a model system. Results showed that Mass ratio hypothesis rules, while trait dissimilarity and species richness do not.

12:00 Wednesday 19th December 2012

04.11

Modelling biota - sediment interactions in estuarine environment

Francesco Cozzoli (NIOZ), Tjeerd J Bouma (NIOZ), Tom Ysebaert (NIOZ - IMARES), Peter MJ Herman (NIOZ)

Although sediment dynamics are mainly driven by hydrodynamic forcing, biotic engineering of the sediments can significantly affect the outcome of physical interactions. We propose an integrated physical-biological model in way to 1) forecast both the morphological and ecological evolution of estuaries 2) explicitly include the role of the

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benthic biota in sediment transport
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04.12

PLANT FUNCTIONAL DIVERSITY VARIATION IN RELATION TO SUCCESSIONAL STAGES AND ENVIRONMENTAL FACTORS IN A TROPICAL DRY FOREST REGION

Carolina Castellanos-Castro (Bournemouth University)

The assessment of plant functional diversity is a promising approach to study forests response to disturbance and to generate useful information for its conservation. This study presents analyses of weighted functional traits of 126 vegetation plots randomly located in three successional stages in a region of tropical dry forests in the Colombian Caribbean and its relation to environmental variables.

12:30 Wednesday 19th December 2012

04.13

Restoration of former agricultural land for multiple outcomes.

Michael P Perring (The University of Western Australia), Rachel J Standish (The University of Western Australia), Kristin B Hulvey (The University of Western Australia), Lori Lach (The University of Western Australia), Tim K Morald (The University of Western Australia), Rebecca Parsons (The University of Western Australia), Raphael K Didham (The University of Western Australia), Richard J Hobbs (The University of Western Australia)

Restoring ecosystems into the future means reassessing goals. One goal may be the continued provision of multiple ecosystem services in a changing environment. Trade-offs among services may prevent their simultaneous attainment. We show, using trees and shrubs in an agricultural landscape, how carbon sequestration may be compatible with biodiversity restoration.

12:45 Wednesday 19th December 2012

04.14

Relationship between plant and soil microbial diversity in Iberian grassland species assemblages

Yoseph Araya (Birkbeck College University of London), Gonzalo Garcia-Baquero (University of the Basque Country)

Soil micro-organisms are of great importance for long term sustainability of ecosystems. In two biodiverse Iberian grassland sites, we tested whether there is a relationship between functional diversity of soil bacteria and vascular plant species diversity; as well as investigating their relationship to soil chemical properties. Results show significant correlation.

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04.15

Macroinvertebrates and ecosystem functioning in lake littoral reedswamps.

Gary S Rushworth (University of Leeds the Freshwater Biological Association), Lee Brown (University of Leeds), Mike Dobson (The FBA)

Reedswamps are disappearing across Europe but expanding within the USA and Australia. Consequences for lake ecosystem functioning are unknown. We propose a method for investigating reedswamp functionality that is focused upon analysis of aquatic macroinvertebrate assemblages. This type of information will facilitate the management of this surprisingly important, diverse and dynamic lacustrine habitat.

13:15 Wednesday 19th December 2012

CLIMATE CHANGE ECOLOGY

07.1

Global Atmospheric Change and Ecology. Unexpected Lessons from Field-Scale Experiments

Stephen P Long (University of Illinois)

Global Atmospheric Change involves changes in multiple edaphic factors. Models predicting the future generally lack realistic testing. The inherent dangers will be illustrated from field scale elevated CO₂ experiments (FACE) which reveal key unexpected effects on insect herbivory, temperature tolerance, plant development and crop nutrition, with profound implications for understanding our future.

09:00 Wednesday 19th December 2012

07.2

Climate exerts direct selection on genomic region in a mountain living bird population

Keith W Larson (Lund University), Miram Liedvogel (Lund University), Max Lundberg (Lund University), Oddmund Kleven (University of Oslo), Terje Laskemoen (University of Oslo), Jan Lifjeld (University of Oslo), BriAnne Addisson (University of Western Sydney), Susanne Åkesson (Lund University), Staffan Bensch (Lund University)

In the Scandinavian willow warbler we found a genetic marker whose allele frequency patterns reflect local adaptation to temperature conditions and short growing season in the mountains. Our results suggest that climate exerts direct selection on the genomic region associated with this allele, making it suitable for monitoring climate change as a force of

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selection on bird populations.

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07.3

500,000 years of vegetation change in western tropical Africa

Charlotte S Miller (The Open University), William D Gosling (The Open University), Timothy Shanahan (University of Texas), Angela L Coe (The Open University)

Sediment cores from Lake Bosumtwi (Ghana) provide a record of West African climate change over the last 500,000 yrs, capturing four glacial-interglacial cycles. Pollen assemblages reveal interglacial periods dominated by woodland and glacial by savannah. Vegetation shows a positive relationship with the 100,000 yr eccentricity and the 41,000 yr obliquity cycle interpreted to result from changes in glacial boundary conditions.

09:30 Wednesday 19th December 2012

07.4

Above Ground Carbon Budgets for Intact and Recently Logged Forests of the Mid Atlantic Coastal Plain

Josh S Brinks (Penn State University), Geoffrey Parker (Smithsonian Institution), Francisca Saavedra (University of Maryland), Nancy Kahn (Smithsonian Institution), Jeffrey Lombardo (Dartmouth), Dawn Miller (Smithsonian Institution), Dan Bebbler (Earthwatch)

The impacts of selection logging on forest carbon budgets will be increasingly important as atmospheric carbon levels continue to rise. For this study we monitored above-ground carbon pools and fluxes across 8 ha of intact and logged forests on the mid-Atlantic coastal plain. This presentation will report the preliminary results for standing biomass, CWD, litter-fall, soil respiration, and ingrowth.

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07.5

An assessment of carbon stock for subtropical forests under different anthropogenic disturbances in Gutianshan, Eastern China

Jiangshan Lai (State Key Laboratory of Vegetation and Environmental Change Institute of Botany Chinese Academy of)

Carbon uptake of regrowth forests is of the central importance in efforts to combat climate change. A study was conducted to measure carbon stocks in subtropical forests including primary, secondary and plantation and estimate the impact of different anthropogenic disturbances on carbon stocks in the forest of Gutianshan, Eastern China.

10:00 Wednesday 19th December 2012

07.6

Climate and the changing microhabitat associations of a butterfly

Callum R Lawson (Centre for Ecology and Conservation University of Exeter Cornwall), Jonathan J Bennie (Environment and Sustainability Institute University of Exeter Cornwall), Jenny A Hodgson (Department of Biology University of York), Chris D Thomas (Department of Biology University of York), Robert J Wilson (Centre for Ecology and Conservation University of Exeter Cornwall)

Management strategies and predictions of species' distributions typically assume constant responses to environmental variables, but climate could drive changes in species' habitat associations. We studied the microhabitats selected for egg-laying by 16 different populations of the silver-spotted skipper butterfly (*Hesperia comma*). Eggs were associated with cooler microhabitats in warmer sites, demonstrating a climate-driven functional response in habitat associations.

10:15 Wednesday 19th December 2012

07.7

Ecological Mismatch: Why Variance Matters

Alex Lord (Imperial College London)

Temperature sensitive seasonal events are likely to change not only in their mean date of occurrence, but also in their variance. Where two species are interacting it is therefore possible that they may become ecologically mismatched due to a narrowing of resource availability. Here I will demonstrate the importance of recording and modelling whole phenological distributions in climate change studies.

10:30 Wednesday 19th December 2012

07.8

Climate-induced changes in bottom-up and top-down processes independently alter marine ecosystems

Malte Jochum (Georg-August-Universität Göttingen), Florian D Schneider (Georg-August-Universität Göttingen), Tasman P Crowe (University College Dublin), Ulrich Brose (Georg-August-Universität Göttingen), Eoin J O'Gorman (Queen Mary University of London)

Two of the mechanisms affecting coastal marine ecosystems under climate change are declining body sizes of predators (a top-down force) and increasing nutrient enrichment (a bottom-up force). We manipulated both in a field experiment investigating the combined effects on the species community. Many elements of the community are affected by one or both forces, including a body-mass induced trophic cascade.

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07.9

Climate change impacts on UK biodiversity and ecosystems: seeing the big picture

Mike D Morecroft (Natural England), Lydia Speakman (Natural England)

The effects of climate change are starting to show across a wide range of organisms and habitats and are expected to increase in future. Climate Change Impacts Report Cards are being developed under the LWEC programme to develop and communicate an integrated assessment of these impacts in the UK, representing the consensus of the research community.

11:45 Wednesday 19th December 2012

07.10

Effect of climate change on the gross primary productivity (GPP) of rich limestone grasslands in the UK

Cristina Chinchilla-Soto (University of Edinburgh), J. Philip Grime (University of Sheffield), Mathew Williams (University of Edinburgh)

A long-term experiment has been used to explore the effects of 20 years of simulated climate change on the gross primary productivity (GPP) of limestone grasslands in the UK. Preliminary results show a 10% reduction on the GPP on the drought treatment. The main drivers of this variation are examined.

12:00 Wednesday 19th December 2012

07.11

Elevated CO₂ effects on Arctic Tundra green house gas emissions

Simon Oakley (NERC Centre for Ecology and Hydrology), Nick Ostle (NERC Centre for Ecology and Hydrology), Alan Jones (University of Aberystwyth), John Scullion (University of Aberystwyth), Dylan G Jones (University of Aberystwyth)

The Arctic is the bellwether of global change and an important reserve of uniquely adapted biodiversity and biogeochemistry. Research examines the long-term acclimation of carbon dynamics in arctic heath exposed to elevated CO₂ concentrations for 20 years. Here we present greenhouse gas emissions from the experiment and discuss implications for plant-soil C dynamics.

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07.12

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Extreme climatic events alter competitive dominance within and between species

Liam Cavin (University of Stirling), Edward P Mountford (JNCC), George F Peterken (NA), Alistair S Jump (University of Stirling)

Extreme drought stress has changed the competitive interactions of trees in a mixed species woodland, through non-linear threshold processes. Differential mortality altered species abundance, alongside the long term failure (1976-2009) of the dominant species to recover to pre-drought growth levels. A co-dominant competitor species benefited from the relaxation of competition.

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07.13

Genetic responses to 17 years of simulated climate change in an intact limestone grassland community

Raj Whitlock (University of Liverpool), J. Phil Grime (University of Sheffield)

We present evidence that coexisting grassland plant populations have made genetic adjustments in phenotype in response to 17 years of simulated summer drought. In some cases, these responses to climatic selection were modified by fine-scale edaphic heterogeneity present within the grassland. Our results suggest that genetic responses contribute to the observed resistance of this grassland to simulated climate change.

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07.14

Impacts of pH and temperature change on predator-prey interactions in a well-characterised food web

Gareth B Jenkins (Queen Mary University of London), Pablo R Lozano (University of Barcelona), Guy Woodward (Queen Mary University of London)

Increasing temperature and acidification are major climatic stressors on freshwater ecosystems, which can have potentially severe consequences for community structure and food web dynamics. We used multiple combinations of species from a well-characterised aquatic food web to characterise how predator-prey functional responses might respond to future warming and pH change.

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07.15

Interactions between decomposer fungi and soil invertebrates in a changing climate

Don A'Bear (Cardiff University), Lynne Boddy (Cardiff University), Hefin Jones (Cardiff University)

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Decomposer fungus and soil invertebrate responses to climate change are mediated by their interactions. Grazing invertebrates can counteract climate-induced stimulation of fungal growth, while shifts in the microbial resource base influence grazer population dynamics. This study furthers mechanistic understanding of these interactions and their influence soil enzyme activity and decomposition.

13:15 Wednesday 19th December 2012

07.16

Plant community responses to flooding

Andrea Oddershede (Aarhus University), Christian Damgaard (Aarhus University)

We look into how the presence of characteristic species, species richness and plant functional traits are related to flooding in humid meadow communities. A topographic wetness index of meadow plots within a Danish monitoring scheme (NOVANA) is derived from remote sensing data and describes the ability of each plot to accumulate water.

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07.17

Invertebrate detritivore responses to enriched-CO₂ leaf litter

Matthew W Dray (Cardiff University)

Elevated atmospheric CO₂ alters the chemical composition of leaf litter, making it less palatable to consumers. We investigated how ambient- and enriched-CO₂ litter from two tree species affected the consumption rates of eight (four terrestrial and four aquatic) invertebrate detritivores in choice and no-choice scenarios, and discuss implications for the process of decomposition in woodland environments.

09:15 Thursday 20th December 2012

07.18

Phenological indices of avian reproduction: cryptic shifts and prediction across large spatial and temporal scales

Philippa R Gullett (University of Sheffield UK), Karl L Evans (University of Sheffield UK), Rob A Robinson (British Trust for Ornithology UK), Ben J Hatchwell (University of Sheffield UK)

Phenology has important demographic implications and is frequently used to assess climate change impacts, but predictive models of future phenology are rare. Using the long-tailed tit, we demonstrate that (i) recent climate change has reduced breeding season

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length, and (ii) a locally-derived climatic model of phenology predicts phenology at larger spatial and temporal scales.

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07.19

Protected area networks preserve avian diversity in the face of climate change and land degradation

Colin M Beale (University of York), Jack J Lennon (Queen's University Belfast), Neil Baker (Tanzania Bird Atlas), Mark J Brewer (Biomathematics and Statistics Scotland)

Many projections suggest climate-driven distribution shifts will leave protected areas impoverished, while other evidence suggests protected (intact) ecosystems should be resilient to change. We identify correlations between recent distribution changes in savannah birds and climate change, protected area status and land degradation. Our results provide evidence of climate-driven range shifts in Africa but support the maintenance of existing protected areas.

09:45 Thursday 20th December 2012

07.20

Predicting the effect of climate change on a temperature-limited forager, the alpine chamois *Rupicapra rupicapra*

Tom HE Mason (Durham University), Stephen G. Willis (Durham University), Philip A. Stephens (Durham University)

In order to predict how individual species will respond to future climatic change, it is important to incorporate life-history data into models. Here, we use data on the foraging behaviour of a mountain ungulate, the alpine chamois, to predict how its daily activity budgets and altitudinal migrations may be altered by future changes in temperature.

10:00 Thursday 20th December 2012

07.21

Warming alters species interactions, size structure and complexity of natural ecosystems

Eoin J O'Gorman (Queen Mary University of London), Doris E Pichler (Queen Mary University of London), Guy Woodward (Queen Mary University of London)

We present data from a geothermal stream system in Iceland, which acts as a natural experiment for studying the impacts of warming. We find that warming alters the strength of interactions between key species, leading to altered population biomasses, mass-abundance scaling and energy transfer efficiency. A range of food web properties are also affected by increasing stream temperature.

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07.22

The consequences of climate warming for upland dung beetle communities in Britain.

Ali J Birkett (Lancaster Environment Centre Lancaster University), Richard Bardgett (Lancaster Environment Centre Lancaster University), Alan Blackburn (Lancaster Environment Centre Lancaster University), Rosa Menendez (Lancaster Environment Centre Lancaster University)

Species in mountain regions are particularly sensitive to climate warming. Here we provide empirical evidence, from a study site in the British uplands, that dung beetles have altered their elevation range in response to 50 years of warming. We show that changes in species range have also caused changes in community composition, and discuss the implications for ecosystem dynamics.

10:30 Thursday 20th December 2012

07.23

The dynamics of food chains under climate change and nutrient enrichment

Amrei Binzer (Goettingen University), Christian Guill (Goettingen University), Ulrich Brose (Goettingen University), Björn C Rall (Goettingen University)

Climate change and nutrient enrichment are two important and often coinciding causes of biodiversity loss. We investigated their single and interactive effects on the biomass and survival of species in a simulated food chain. The nonlinear model incorporates temperature and body-mass dependencies of biological rates and provides a mechanistic prediction of the interplay of both effects.

10:45 Thursday 20th December 2012

07.24

The effect of saltwater inundation on coastal ecosystems

Simon PG Hoggart (University of Plymouth), Anissia White (University of Plymouth), Micheal E Hanley (University of Plymouth), Richard C Thompson (University of Plymouth)

Flooding of coastal areas by saltwater resulting from storm surge events will become increasingly frequent due to climate change. To test the impact this might have on coastal ecosystems, a range of typical coastal plants representing different functional groups were subjected to saltwater inundation for between 48-96 hours. Results showed that impact varied depending on functional groups of the plants.

11:30 Thursday 20th December 2012

07.25

The response of leaf phenology in riverine environments across a rural-urban gradient

Chih-Wei Tsai (Department of Animal and Plant Sciences The University of Sheffield), Thomas Young (Department of Animal and Plant Sciences The University of Sheffield), Philip Warren (Department of Animal and Plant Sciences The University of Sheffield), Lorraine Maltby (Department of Animal and Plant Sciences The University of Sheffield)

Air temperature is an important determinant of tree phenology. However, the effect of urban heat islands on leaf phenology in riverine environments has not been fully investigated. This study aims to examine the influences of terrestrial and riparian areas on tree phenology across a rural-urban gradient, in the Sheffield region.

11:45 Thursday 20th December 2012

07.26

Variation in physical dormancy: fire vs seasonal temperature thresholds and relative susceptibility to climate change

Mark KJ Ooi (University of Wollongong), Andrew J Denham (Office of Environment Heritage), Tony D Auld (Office of Environment Heritage)

Which seed dormancy traits are ideal for plant population persistence in fire-driven ecosystems? Are some species more tightly bound to fire than others? Using species with physically dormant seeds, we assessed the variation in dormancy-breaking threshold temperatures between co-occurring species. Two functional groups, based on fire- or season-related dormancy responses, were identified, allowing broader predictive power of climate change impacts.

12:00 Thursday 20th December 2012

07.27

Running out of luck: Uphill plant race in the Himalayas

Petr Macek (Estacion Experimental de Zonas Aridas CSIC), Francisco I Pugnaire (Estacion Experimental de Zonas Aridas CSIC), Leoš Klimeš (Institute of Botany ASCR)

Surprisingly fast plant responses to climate change in a pristine area indicate plants can be very warming-responsive, which can nevertheless have consequences for their survival under future conditions. Migrating species possessed smaller seeds leading to a community reassembly; hence, alpine vegetation is not simply moving upward as an intact community.

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07.28

Vulnerability of aquatic birds to hydrological disturbance: climate change implications

Alexander Royan (University of Birmingham), Jonathan P Sadler (University of Birmingham), David M Hannah (University of Birmingham), S James Reynolds (University of Birmingham), David G Noble (British Trust for Ornithology)

Climate change-altered flows threaten aquatic birds by disrupting food webs and habitat. Yet understanding of hydrological variability as a driver of species' distribution is limited. Using a long-term data set of bird records and flow archive data we investigate the relationship between aquatic bird distribution and indices of hydrological variability and assess the vulnerability of species to altered hydrological regimes.

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07.29

Winners and losers in a changing climate

James W Pearce-Higgins (British Trust for Ornithology), Sarah Eglington (British Trust for Ornithology), Dan E Chamberlain (Universita di Torino)

Phenological and distribution changes in response to recent climate change are well described, but relatively few studies document impacts on populations. Using long-term monitoring data, we quantify the impacts of recent climate change on population trends of 63 UK breeding birds, and identify what it takes to be a climate change winner.

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07.30

Winter abundance and distribution changes of a leaf-warbler at the northern limit of its wintering range during a period of climate warming.

Greg J Conway (British Trust for Ornithology)

Both winter abundance and distribution of common chiffchaff *Phylloscopus collybita*, in Britain and Ireland, have increased considerably between the 1970s and 2000s; the two main drivers identified were reduction in winter severity and an increasing breeding population. Wintering individuals originated mainly from Western Europe, with small but increasing numbers from Asia. Migration timing and winter survivorship were also investigated.

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PARASITES PATHOGENS AND WILDLIFE DISEASE

25.1

Brushtail possum sociality and TB transmission: Challenging preconceptions and identifying patterns

Dan Tompkins (Landcare Research), Carlos Rouco (Landcare Research), Kyle Richardson (Massey University), Jackie Whitford (Landcare Research), Graham Nugent (Landcare Research), Nigel French (Massey University), Bryce Buddle (AgResearch)

The brushtail possum is the key wildlife maintenance host of bovine tuberculosis (TB) in New Zealand. However, possums are perceived as solitary animals. With TB being rapidly killed in the environment, this raises questions about how the disease persists. We demonstrate far greater than expected sociality among over 150 contact-logging collared wild free-living individuals, relating patterns observed to TB incidence.

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25.2

Dynamics of shedding in bacterial-helminth co-infections

Isabella M Cattadori (The Pennsylvania State University)

Co-infections affect parasite transmission but how this happens is unclear. We used an experimental approach and examined the dynamics of shedding of a respiratory bacterium and two gastrointestinal nematodes, common infections of the European rabbit. We showed that co-infection significantly enhanced the amount of bacteria and helminths shed although large variability was observed within and between hosts.

09:15 Wednesday 19th December 2012

25.3

Differential responses to parasitism of species within functional groups may underpin variability in the impact of *Rhinanthus minor* at the community level

James P Fisher (University of Sheffield), Gareth K Phoenix (University of Sheffield), Malcolm C Press (University of Birmingham), Duncan D Cameron (University of Sheffield)

The root-hemiparasite *Rhinanthus minor* is known to have dramatic impacts on grassland community structure, suppressing grass biomass while promoting forbs. However, substantial variation in the magnitude of the impact of *Rhinanthus* on contrasting functional groups has been observed. Our greenhouse study has revealed that differential responses of species within functional groups may, in part, underpin this variation.

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25.4

DISEASE DYNAMICS IN WATER VOLE METAPOPOPULATIONS

Claire L Davies (University of Aberdeen), Xavier Lambin (University of Aberdeen), Sandra Telfer (University of Aberdeen)

Using a well characterised water vole (*Arvicola amphibius*) metapopulation, this research project explores the extent to which endemic parasite dynamics are influenced by host metapopulation structure. Specifically, I will be using examples of microparasites and macroparasites with differing life histories to discuss how population size, connectivity, and transmission from alternative hosts can influence the distribution and prevalence of infected hosts.

09:45 Wednesday 19th December 2012

25.5

Modelling how ecological interactions between coinfecting parasites alter treatment outcomes

Emily C Griffiths (University of Sheffield), Amy B Pedersen (University of Edinburgh), Owen L Petchey (University of Zürich), Andy Fenton (University of Liverpool)

Treating a person for one infection could affect other infections. Many parasites co-occur in human communities and infect millions of people, but interactions among coinfecting parasites are rarely considered when planning or evaluating treatment programs. I present a model where either “top-down” (immune-mediated) or “bottom-up” (resource-mediated) parasite interactions modify health outcomes, in order to identify scenarios for successful treatment programs.

10:00 Wednesday 19th December 2012

25.6

Factors driving interspecific parasite associations within a wild rodent parasite community

Andy Fenton (University of Liverpool), Sarah C. L. Knowles (Imperial College), Owen L Petchey (University of Zurich), Amy B Pedersen (University of Edinburgh)

Like most habitats, individual hosts can potentially support large communities of a diverse array of species (parasites and pathogens), exploiting a variety of niches, feeding on various resources, and faced with a range of natural enemies (immune components). Using data from a natural host parasite community we ask, what factors (habitat, resources or ‘enemies’) drive patterns of parasite species associations?

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25.7

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Gata3 and tolerance to infection in wild rodents

Joseph A Jackson (Aberystwyth University), Steve Paterson (University of Liverpool), Richard Birtles (Salford University), Ida Friberg (Aberystwyth University), Amy Hall (University of Nottingham), Ann Lowe (University of Nottingham), Catriona Ralli (University of Nottingham), Jan Bradley (University of Nottingham), Mike Begon (University of Liverpool)

Pathogen tolerance is a neglected strategy with significant ecological implications. Elevated ability of activated splenocytes to express Gata3 was a signature for infection tolerance (good body condition relative to infection burden) in wild field voles. Gata3 expression was triggered by macroparasite exposures and causally linked to host responses that optimized somatic maintenance and ultimately survival at the expense of reproduction.

10:30 Wednesday 19th December 2012

25.8

Macronutrient requirements during host-parasite interactions

Joanna L Randall (Lancaster University), Kenneth Wilson (Lancaster University)

Disease resistance is nutrition-dependent, which may be a result of the acquisition and allocation of resources by the host, or resource availability to the parasite. Using the geometric framework, we examined trait-specific nutritional requirements for an insect host and a bacterial parasite, in order to identify the role of macronutrients in determining the outcome of infection.

10:45 Wednesday 19th December 2012

25.9

Outcome of ecological interaction between root-hemiparasites and their hosts is largely determined by substrate humidity and nutrient availability

Jakub Tesitel (University of South Bohemia), Tamara Tesitelova (University of South Bohemia), James P Fisher (University of Sheffield), Jan Leps (University of South Bohemia), Duncan D Cameron (University of Sheffield)

Root-hemiparasites represent a special functional group of temperate grasslands. Based on a mesocosm experiment with *Rhinanthus alectorolophus*, we demonstrate that the nature of their interaction with hosts substantially changes along the environmental gradients of humidity and nutrient availability. We also reveal underlying physiological mechanisms using a carbon stable isotope analysis and chlorophyll fluorescence.

11:45 Wednesday 19th December 2012

25.10

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Parasites of nestling seabirds affect siblings unequally

Hanna M V Granroth-Wilding (Institute of Evolutionary Biology University of Edinburgh), Sarah Burthe (Centre for Ecology and Hydrology), Sue Lewis (Institute of Evolutionary Biology University of Edinburgh), Francis Daunt (Centre for Ecology and Hydrology), Emma Cunningham (Institute of Evolutionary Biology University of Edinburgh)

Parasitic infection during development has the potential to shape the rest of an organism's life. We experimentally reduced the parasite load of nestling European shags across four years, and show that last-hatched brood members are most heavily impacted by parasitism. This effect is stronger in years of low breeding success. These patterns are mediated by behavioural interactions within the brood.

12:00 Wednesday 19th December 2012

25.11

Pathology of bovine TB varies with *Mycobacterium bovis* genotype but outbreak size or skin test detectability do not

David M Wright (Queen's University Belfast), Adrian R Allen (Agri-Food and Biosciences Institute), Thomas R Mallon (Agri-Food and Biosciences Institute), Stanley W. J. McDowell (Agri-Food and Biosciences Institute), Robin A Skuce (Agri-Food and Biosciences Institute)

We used an eight year population wide survey of *M.bovis* genotypes isolated from cattle in Northern Ireland, investigating the influence of pathogen genotype on host response. Lesion distribution varied subtly with genotype but genotype does not appear to influence outbreak size or detectability of cases to the skin test, the primary means of bovine TB screening in the UK.

12:15 Wednesday 19th December 2012

25.12

Plant-parasite stable polymorphisms: a simple but overlooked solution?

Ryan T Sharp (Rothamsted Research), Femke Van den Berg (Rothamsted Research), Michael W Shaw (University of Reading), Frank Van den Bosch (Rothamsted Research)

Many studies have tried identifying what causes stable polymorphisms in gene-for-gene systems by testing various specific and complex factors. We tested whether they can be caused by simple epidemiology alone and found that density-dependence can cause stable polymorphisms and that the mode of coinfection can greatly affect the evolutionary outcome.

12:30 Wednesday 19th December 2012

25.13

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The impact of over-winter parasitism on a free-ranging ungulate in the high Arctic

Anja M Carlsson (Lancaster University), Justin Irvine (The James Hutton Institute), Stephen J Coulson (University Centre in Svalbard), Erik Ropstad (Norwegian School of Veterinary Science), Audun Stien (Norwegian Institute for Nature Research), Kenneth Wilson (Lancaster University), Steve D Albon (The James Hutton Institute)

Theories suggest parasites can regulate host populations but few have quantified the impact of parasites in wild animals. A novel delayed-release intra-ruminal bolus was developed to remove nematode parasites from Svalbard reindeer during early winter. By measuring body-mass and pregnancy of animals re-caught in February and April, we were able to quantify the effects of over-winter parasitism on reindeer fitness.

12:45 Wednesday 19th December 2012

25.14

Population and disease modelling in the Tasmanian devil

Nicholas J Beeton (University of Tasmania), Hamish I McCallum (Griffith University), Larry K Forbes (University of Tasmania), Clare Hawkins (Department of Primary Industries Parks Water and Environment Tasmania Australia)

The Tasmanian devil *Sarcophilus harrisii* is threatened by a unique infectious cancer, Devil Facial Tumour Disease (DFTD). Using modelling, we examine management strategies such as selective culling, and attempt to shed some light on relevant problems such as mapping its pre-DFTD abundance, estimating the disease's infectiousness and latency, and modelling its spatial progression.

13:00 Wednesday 19th December 2012

25.15

Predatory functional responses of native vs. exotic amphipods: effects of predation risk and parasitism

Rachel A Paterson (Queen's University Belfast), Marilyn Ennis (Queen's University Belfast), Jaimie T A Dick (Queen's University Belfast), Melanie J Hatcher (University of Leeds), Alison M Dunn (University of Leeds)

The presence of higher trophic predators may alter an exotic species' predatory function as a result of the exotic species' own predation risk and behaviour modifications induced by parasites. Our results suggest that native and exotic amphipods make different foraging choices dependent on the combined influences of predation risk and parasitism, and that this behaviour is community context dependent.

13:15 Wednesday 19th December 2012

LARGE SCALE ECOLOGY - LANDSCAPES METAPOPOPULATIONS AND MACROECOLOGY

36.1

Climatic means, variances, trends, autocorrelations and unusual events as drivers of British bird temporal turnover

Jack J Lennon (Queen's University Belfast), Mark Brewer (Biostatistics Scotland), James W Pearce-Higgins (British Trust for Ornithology), Kevin J Gaston (University of Exeter)

We tested hypotheses explaining how different components of climate drive temporal turnover of British birds with three climatic variables: minimum temperature, growing degree-days and water balance. We modelled the proportions of species going locally extinct/recolonising as a function of their climatic means, variances, long-term trends, year to year autocorrelation and unusual events. Climatic means and variances both matter for turnover.

09:00 Wednesday 19th December 2012

36.2

Extracting trends from citizen science monitoring data

Nick JB Isaac (Centre for Ecology Hydrology), Arco Van Strien (Statistics Netherlands), David B Roy (Centre for Ecology Hydrology)

Trends in species' status occupy a central role in biodiversity conservation. Volunteer-collected biological records represent a huge, but largely untapped, resource for estimating trends. I present computer simulations to compare several methods for estimating trends, under different scenarios of recorder behaviour. I derive rules of thumb for which methods to use, and apply them to hundreds of UK invertebrate species.

09:15 Wednesday 19th December 2012

36.3

Global patterns in mammalian ecology

Andrew Clarke (British Antarctic Survey)

Mammals exhibit a range of energetic strategies, which vary with size, diet and environment, and which relate to their ecological niche. Sufficient data now exist for these to be examined on global scales. Preliminary analyses indicate latitudinal variations in energetic niches and body temperature, as well as a relationship between diet, latitude and energetics.

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36.4

Impacts of roads on landscape connectivity and fragmentation

Nova Sharkey (Trinity College Dublin), David Bourke (Trinity College Dublin), Pádraig Whelan (University College Cork)

Roads interact with, and impact on, landscape ecology by affecting the connectivity and fragmentation of landscape components. Aerial photographs and Geographic Information System (GIS) were used to assess and quantify the impact of road construction on landscape ecology and diversity, in particular structure and composition, by comparing 'roaded' and 'non-roaded' landscapes in Ireland.

09:45 Wednesday 19th December 2012

36.5

Marine biodiversity: from molecules to macroecology, assessing species responses to climate change and ocean acidification.

Nova Mieszkowska (Marine Biological Association of the UK), Mike Burrows (Scottish Association for Marine Science), Steve Hawkins (University of Southampton)

The MarClim time-series has demonstrated the fastest biogeographical range shifts of rocky intertidal species in response to climate warming globally. Species-specific responses are altering macroecological clines in community structure across Europe. Mesocosm experiments are linking molecular and physiological mechanistic responses of organisms to changes in sea temperature and pH, demonstrating how they drive poleward expansions or contractions of species distributions.

10:00 Wednesday 19th December 2012

36.6

Model of spatial distribution of *Calanus finmarchicus* accounting for the physical structure of the marine environment.

Anna Krystalli (University of Sheffield), Robert P Freckleton (University of Sheffield), Martin Edwards (Sir Alister Hardy Foundation for Ocean Science), Paul J Somerfield (Plymouth Marine Laboratory), Peter Miller (Plymouth Marine Laboratory), Thomas J Webb (University of Sheffield)

Using machine learning techniques, we present a model of the spatial distribution of abundance of the copepod *Calanus finmarchicus* in the North Sea. The model combines continuous plankton recorder and satellite derived data, in particular data on the intensity of oceanographic fronts, thus incorporating the mesoscale physical structure of the marine environment, an important determinant of passive aggregation of plankton.

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36.7

Towards a better understanding of factors determining body size spectra in marine ecosystems

Tsuyuko Yamanaka (University of Liverpool), Chris Frid (University of Liverpool)

Marine benthic biomass spectra are affected by biological and environmental factors, and may have the potential, with elements of taxonomy incorporated, to produce universal indicators of ecosystem status. This experimental study examines if body size distribution is related to sediment particle size to aid our understanding of the role of the body size spectra in benthic ecology.

10:30 Wednesday 19th December 2012

36.8

Networks on networks

Florian Schwarzmüller (University of Goettingen), Ulrich Brose (University of Goettingen)

Species in a food web are linked via trophic interactions whereas different habitat patches are linked via species dispersal. Both dynamics and their combination are topics of meta-community ecology. We hereby present a fully allometric model, in which all phylogenetic and dispersal parameters depend on population body masses. We link two patches with simple food-web motifs and then increase complexity.

10:45 Wednesday 19th December 2012

36.9

Quantitative measures of vegetation as predictors of fine-scale temperature variation

Andrew J Suggitt (University of York), Jane K Hill (University of York), David B Roy (Centre for Ecology and Hydrology), Chris D Thomas (University of York)

Policymakers need to know how species will respond to climate change at the landscape level. To determine this we need to know what drives climate at this scale. Here, we test the ability of a number of measures of vegetation structure at explaining and predicting fine-scale temperature variation, and examine the implications for future climate and species distribution modelling.

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36.10

Space to move? Discovering movement patterns of birds in the urban environment

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Emma J Rosenfeld (University of Birmingham), Adam J Bates (University of Birmingham), Stefan Bodnar (RSPB), S J Reynolds (University of Birmingham), Jon P Sadler (University of Birmingham)

To function properly green spaces in cities should be functionally connected. This study focuses on green space connectivity *via* an examination of bird movement through the cityscape and the ecologically valuable features of urban green spaces to birds. Using ringing data, movements of birds demonstrate the permeability of the city.

11:45 Wednesday 19th December 2012

36.11

Spatio-temporal patterns of flowering across different pollination modes: a network approach

Daniel W. Carstensen (Unesp Rio Claro), L. Patricia C. Morellato (Unesp Rio Claro)

We study the relation between flowering synchronicity and the relative spatial position of individuals using a network approach. Here, individuals are connected if they overlap in flowering. Closely connected individuals form compartments in the network. Depending on pollination mode, we find significant spatial autocorrelation of compartment designation. Individuals that are spatially aggregated overlap intensely in flowering, possibly to facilitate cross-pollination.

12:00 Wednesday 19th December 2012

36.12

Microbial Land Grabbing: Flexing their tendrils

Christopher L Coles (University of Exeter), David J Hodgson (University of Exeter), Stuart B Townley (University of Exeter)

When establishing themselves in different environments, bacteria exhibit a variety of weird and spectacular spatial dynamics. How these spatial dynamics are formed and how they offer an ecological benefit to the microbial colony are important yet relatively unexplored questions. Our findings show that colonies with irregular spatial dynamics have a greater ability to acquire resources compared to circular shaped colonies.

12:15 Wednesday 19th December 2012

36.13

Swapping species richness gradients for species range limits unearths the importance of plate tectonics as a driver of coral biogeographic structure

Sally A Keith (ARC Centre of Excellence for Coral Reef Studies), Andrew H Baird (ARC Centre of Excellence for Coral Reef Studies), Josh S. Madin (Macquarie University), Terry P Hughes (ARC Centre of Excellence for Coral Reef Studies), Sean R Connolly (ARC

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Centre of Excellence for Coral Reef Studies)

We find that Indo-Pacific corals are assembled as distinct faunal provinces, delineated by faunal breaks where multiple species reach geographical range limits. Breaks exhibit little concordance with transitions in current environmental conditions. Instead, striking concordance with transitions between tectonic plates and mantle plume tracks implies historical processes drive this pattern.

12:30 Wednesday 19th December 2012

36.14

The global diversity of birds in space and time

Gavin H Thomas (University of Sheffield), Walter Jetz (Yale University), Arne O Mooers (Simon Fraser University), Jeffrey B Joy (Simon Fraser University), Klaas Hartmann (University of Tasmania)

I will present analyses of the first dated phylogeny of all extant species of birds. Avian diversification rates increase towards the present, driven by radiations that are interspersed throughout the tree. Geographic differences in diversification rates are hemispheric not latitudinal, with assemblages in Asia, North America and Southern South America containing a disproportionate number of species from recent rapid radiations.

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36.15

Unravelling the shared effects of space and phylogeny on range filling: what can different methods tell us?

Sarah Whitmee (IUCN), David Orme (Imperial College London)

Dispersal ability is thought to influence the extent of environmentally suitable habitat filled by the observed geographic range. In reality, 'range filling' is likely to be the result of both heritable traits and spatially related factors. We used two models, with differing evolutionary assumptions to tease apart drivers in observed patterns in range filling.

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36.16

Stack and adjust: Steps towards constraining single species distribution models by macroecological models to prediction of species richness

Carsten F Dormann (Uni Freiburg), Justin M Calabrese (Smithsonian Conservation Biology Institute)

Species distribution models (SDMs) describe the probability of occurrence for target species for a given site. We present a probabilistic framework behind such an approach

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and illustrate it with four very different data sets. Our results show that stacked SDMs are systematically biased in their estimation of species richness. Our framework uses macroecological models to constrain predictions for single species.

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PHYSIOLOGY AND LIFE HISTORY EVOLUTION

43.1

Linking immunology and demograph in a wild mammal population

Daniel H Nussey (University of Edinburgh)

The links between immunity, parasite burden and host demography and population dynamics remain poorly characterised in wild mammals. I will present data from wild Soay sheep on St Kilda testing associations between key elements of humoral immunity (circulating antibody levels of different isotypes and specificities) and parasite burdens, condition and over-winter survival in both neonates and adult animals.

09:00 Wednesday 19th December 2012

43.2

Comparing reproduction and development in 3 species of hyperparasitoids in the genus *Gelis*

Jeffrey A Harvey (Netherlands Institute of Ecology), Bertanne Visser (Vu University), Cecile Le Lann (Vu University)

This study reports differences in progeny allocation, host preference and resource utilization in three closely related species of hyperparasitoids. Two species are wingless and the other has wings. The results suggest that variation in morphological traits and ecology, as well as interactions with ants, strongly influence reproductive success, behaviour and development.

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43.3

Did bigger seeds make better crops?

Catherine Preece (University of Sheffield), Mark Rees (University of Sheffield), Georg Frenck (University of Sheffield), Mike Charles (University of Sheffield), Glynis Jones (University of Sheffield), Colin P Osborne (University of Sheffield)

An ecological model of domestication hypothesises that crop progenitors have traits which were advantageous in areas of human settlement, e.g. greater seed yield, biomass and

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height, and that these traits co-vary with seed mass. This was tested for grasses and legumes in a glasshouse experiment and patterns between and within species are discussed.

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43.4

Disentangling phenotypic plasticity and evolutionary change in insects using probabilistic reaction norms

David S Boukal (Biology Centre AS CR Ceske Budejovice Czech Republic), Tomas Ditrich (University of South Bohemia Ceske Budejovice Czech Republic), Mikko Heino (University of Bergen Bergen Norway)

Recently developed theory of probabilistic reaction norms (PRNs) can help separate phenotypic plasticity from presumed evolutionary effects. We demonstrate the potential of PRNs for life history evolution studies in insects in a non-model semiaquatic heteropteran, *Microvelia reticulata*. We show that both dimorphic growth rates and dimorphic PRNs across multiple instars drive sexual dimorphism in adult size in this species.

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43.5

Genotype specific anti-predator strategies in *Daphnia pulex*

Kylie S R Yarlett (The University of Sheffield), Andrew P Beckerman (The University of Sheffield)

Daphnia respond to their predators with changes in several morphological, behavioural and life history traits. We examine the genotype specific relationships across a suite of traits representing these predator induced changes in 19 genotypes of *Daphnia pulex*, from three source populations. We find large differences in the relationships between traits among the genotypes.

10:00 Wednesday 19th December 2012

43.6

Heat Stress Impedes Development and Lowers Fecundity of the Brown Planthopper *Nilaparvata lugens* (Stål)

Jiranan Piyaphongkul (School of Biosciences University of Birmingham), Jeremy Pritchard (School of Biosciences University of Birmingham), Jeff Bale (School of Biosciences University of Birmingham)

When nymphs were exposed at their ULT₅₀ mean development time to adult was increased in both males and females. Exposure of nymphs and adults at their ULT₅₀ temperatures significantly extended the time required for their progeny to complete egg

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development for all mating combinations compared with control. Overall, sub-lethal heat stress inhibited development, lowered fecundity and extended egg development time.

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43.7

Hormonal Control of Life History Trade-offs

Catherine Reavey (Queen's University Belfast)

In this talk I will discuss the hormonal control of reproduction and immune function, in conjunction with my work on the burying beetle, *Nicrophorus vespilloides*, and the hormone Juvenile Hormone. I will cover my work to date regarding manipulation of hormone levels, and the resulting reproductive success and level of investment into immunity.

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43.8

Leaf defences in tropical tree seedlings: shedding light into herbivory-mediated patterns of biodiversity

Simon A Queenborough (The Ohio State University), Margaret Metz (University of California Davis), Renato Valencia (Pontificia Universidad Catolica del Ecuador)

Leaf defences typical of tropical forest species include delayed greening and extra-floral nectaries. Do species invest more in leaf defences in areas of higher herbivore pressure? From comprehensive surveys in Ecuador (high) and Panama (low), we examined differences in the incidence of leaf defences, and the effects of defences on the long-term growth and survival rates of 1,300 tree species.

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43.9

The global distributions of C₃ and C₄ grassy biomes

Colin P Osborne (University of Sheffield), C4 Grasslands Working Group (NESCent)

We present a new global map of biomes where the ground cover is dominated by grasses, and the first attempt to globally map C₃ and C₄ dominant grasses based entirely on ground-based observations. The distributions of dominant grass species are explained in relation to phylogeny, photosynthetic pathway, climate and fire.

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43.10

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The mechanistic basis of the growth-survival trade-off in plants

Rebecca RL Atkinson (University of Sheffield), Mark Rees (University of Sheffield), Mike M Burrell (University of Sheffield), Colin P Osborne (University of Sheffield), Karen Rose (University of Sheffield)

Non-targeted metabolomics provides a snapshot of the relative concentration of metabolites present in biological tissue. We used metabolomics to explore the relationships between growth and nutrient storage in seven monocarpic plant species. Size-corrected RGR was negatively associated with allocation to root carbohydrates and amino acids. Storage is likely to be a key trait underpinning the growth-survival trade-off in plants.

12:00 Wednesday 19th December 2012

43.11

Life in the tropics: estimating tropical passerine survival rates

Hannah Clarke (The James Hutton Institute Dundee The University of Dundee)

Little is known about survival rates and life history patterns of tropical birds, partly due to the paucity of data. Analysis of mark-recapture data collected over five years on a constant effort basis from the forests of Trinidad enabled survival rates to be estimated for 18 tropical passerines, and for potential life history trade-offs in these species to be explored.

12:15 Wednesday 19th December 2012

43.12

Eco-demographic continua in plants

Rob Salguero-Gomez (Max Planck Institute for Demographic Research), Eelke Jongejans (Radboud University), Owen Jones (Max Planck Institute for Demographic Research), Cyril Mbeau Ache (Plymouth University), Pieter Zuidema (Wagening University), Alexander Scheuerlein (Max Planck Institute for Demographic Research), Miguel Franco (Plymouth University), Hans De Kroon (Radboud University)

Life-history theory predicts the existence of a main axis of demographic variation: the fast-slow continuum. Here we use the COMPADRE database to examine demographic variation in 383 plants. We found two primary axes: the fast-slow continuum, strongly influenced by phylogeny, and a second, novel axis related to reproductive investment and not driven by phylogenetic nor environmental filtering, suggesting its universality.

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43.13

Effect of lead chloride toxicity on seed germination and seedling development of

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***Cucumis sativus* L. (Cucumber)**

Mariam F. EL-Barghathi (University of Benghazi (Garyounis)), Fayruse M. Almehdawy (University of Benghazi)

The effect of ionic toxicity of different concentrations of lead chloride salt was examined by measuring different parameters during seed germination and seedling development of *Cucumis sativus* L. This species could tolerate the toxicity of lead chloride and could be used as a phytoremediation tool.

Key words: Lead chloride, Cucumber., phytoremediation

12:45 Wednesday 19th December 2012

43.14

Responses to ozone treatment in six *Quercus ilex* populations. A test of the core-periphery paradigm.

Ana García-Nogales (Área de Ecología. Universidad Pablo de Olavide), Rocío Cortés-Gazán (Área de Ecología. Universidad Pablo de Olavide), Daniel Vázquez-Hidalgo (Área de Ecología. Universidad Pablo de Olavide), Rafael Espinar (Área de Ecología. Universidad Pablo de Olavide), Amanda González-Tránchez (Área de Ecología. Universidad Pablo de Olavide), Juan C. Linares (Área de Ecología. Universidad Pablo de Olavide), José I. Seco (Área de Ecología. Universidad Pablo de Olavide), José Á. Merino (Área de Ecología. Universidad Pablo de Olavide)

We analyzed the photosynthetic responses (gas exchange and fluorescence) of 150 days old potted seedlings to ozone and latitude in populations located across the range of the species.

We conclude that the populations native to the Northern and the Southern borders of the range are more resistant to ozone but display a lower acclimation capacity to change in resource availability.

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COMPETITION - RESOURCES SPACE AND TIME

10.1

The hare and the tortoise: strategies for plant competition

Markus P Eichhorn (University of Nottingham), Reuben Nilus (Forest Research Centre Sepilok Sabah Malaysia), David FRP Burslem (University of Aberdeen)

Plant growth is often characterised as a single rate parameter, yet this obscures strategic variation in not only the magnitude of peak growth, but also its timing and duration. We document growth of tree seedlings in rain forest gaps in Malaysia over ten years and

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illustrate variation across species and with respect to resource conditions.

11:45 Wednesday 19th December 2012

10.2

Ant communities of the high rainforest canopy are structured competitively through space and time

Kalsum Yusah (Inst. for Tropical Biology Conservation Universiti Malaysia Sabah), Tom M Fayle (University of South Bohemia), William A Foster (University of Cambridge)

Most ant communities are thought to be strongly structured by competition. We investigated this in the high canopy (>40m) of tropical rainforest in Borneo. Using null models of species co-occurrence we demonstrate that ant communities show competitive structuring both spatially (within and between trees), and temporally (24-hour periods). Ant communities are competitively structured, even in this extreme environment.

12:00 Wednesday 19th December 2012

10.3

DIVERSITY AWARENESS: Using genetic mixtures to improve yield stability

Henry E Creissen (John Innes Centre), Tove H Jorgensen (University of East Anglia), James K.M. Brown (John Innes Centre)

Agricultural practices rely on the use of monocultures to achieve high yields. Genetic mixtures may provide a response to the challenge of increasing yield stability in unpredictable environments, without high dependence on chemical inputs. Data from large scale experiments indicate a positive effect of mixtures in stabilising yield across environments through compensatory interactions.

12:15 Wednesday 19th December 2012

10.4

Natal environment impacts adult reproductive success in burying beetles (*Nicrophorus vespilloides*)

Ailsa H C McLean (University of Oxford), Andres Arce (University of Manchester), Per Smiseth (University of Edinburgh), Daniel Rozen (Leiden University)

Burying beetles rear their offspring on carrion, providing high levels of parental care. Larvae face severe competition from microbes during development and this competition affects reproductive success. We find that poor natal environment negatively affects parental performance in adulthood, but beetles can partially mitigate this effect via changes in investment.

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10.5

Predicting foraging time constraints under environmental change: an individual based model of social foraging behaviour

Harry H Marshall (Institute of Zoology ZSL), Alecia J Carter (University of Cambridge), Tim Coulson (Imperial College London), J Marcus Rowcliffe (Institute of Zoology ZSL), Guy Cowlshaw (Institute of Zoology ZSL)

Foraging time is an important constraint on social animals' ability to invest in other fitness-linked activities. We develop and validate a model of individual baboon foraging behaviour predicting the time they need to spend foraging in differing environments. In deteriorating environments this model predicts a rapid increase in foraging time to the point where individuals cannot gather enough resources.

12:45 Wednesday 19th December 2012

10.6

Seasonal variation and land-use effects on competition for nitrogen uptake between plant and soil microbial communities in subalpine grasslands

Nicolas K Legay (Laboratoire d'Ecologie Alpine), Fabrice Grassein (Laboratoire d'Ecophysiologie Vegetale et Agronomie), Sandra Lavorel (Laboratoire d'Ecologie Alpine), Emmanuelle Personeni (Laboratoire d'Ecophysiologie Vegetale et Agronomie), Marie-Paule Bataillé (Laboratoire d'Ecophysiologie Vegetale et Agronomie), Matt Robson (Department of Biosciences Plant Biology), Jean-Christophe Clément (Laboratoire d'Ecologie Alpine)

At the end of snowmelt, plant rates of N uptake exceeded those of microbes due to either a crash in microbial communities or to their compositional turnover. While vegetation dominated by conservative plants grew steadily until biomass peak, exploitative communities maximised growth in response to the soil N pulse at snowmelt.

13:00 Wednesday 19th December 2012

10.7

Plant root exudates mediate neighbour recognition and trigger complex behavioural changes

Marina Semchenko (University of Tartu), Sirgi Saar (University of Tartu), Anu Lepik (University of Tartu), Kristjan Zobel (University of Tartu)

The mechanisms by which plants detect the presence and identity of competitors remain largely unknown. We found that plant root exudates can carry very specific information about the genetic relatedness, species identity and population origin of neighbours. Moreover, exudates can trigger far more complex behavioural changes than has previously been shown.

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THEMATIC TOPIC: NEW DIRECTIONS IN PHENOLOGY AT A MACRO SCALE

TT7.1

Long-term and large-scale: phenology in the 21st century

Tim H Sparks (Coventry University)

20 years ago phenology was a much derided topic, but there has since been a sea change in attitudes. It has become a major component of climate change impact studies providing key evidence for the IPCC.

I provide an overview of some of the changes taking place in phenology, in attitudes towards phenology, and in analytical approaches to phenology.

09:00 Thursday 20th December 2012

TT7.2

Influence of temperature on changing vegetation phenology in Northern China detected from satellite data

Heiko Balzter (University of Leicester), Xingmei Xu (University of Leicester)

New directions in phenology research at macro-scales are presented, adopting a remote sensing approach. Analysis of time-series of satellite imagery provides important insights into vegetation phenology. Eleven years of SPOT Vegetation NDVI were analysed for Northern China. An empirical link between temperature and vegetation phenology, and changes in vegetation productivity and vegetation phenology in Northern China were found.

09:30 Thursday 20th December 2012

TT7.3

Linking phenological changes and range shifts in British plants

Tatsuya Amano (University of Cambridge), Robert P Freckleton (University of Sheffield), Simon A Queenborough (The Ohio State University), Simon D Doxford (University of Sheffield), Richard J Smithers (AEA Technology plc), Tim H Sparks (University of Life Sciences), William J Sutherland (University of Cambridge)

Plant species differ in their capacity to adjust their flowering time to variation in temperature. Using historical records of the phenology and spatial distribution of British plant species, we have shown that those which track changes more closely (i.e., temporal

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climatic niche conservatism) show reduced northward and altitudinal range shifts and consequently lower spatial climatic niche conservatism.

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TT7.4

Phenology predicts the native and invasive range limits of common ragweed (*Ambrosia artemisiifolia* L.)

Daniel S Chapman (NERC Centre for Ecology Hydrology), James M Bullock (NERC Centre for Ecology Hydrology), Tom Haynes (NatureBureau), Stephen Beale (NatureBureau), Franz Essl (Environment Agency Austria)

Current species distribution models are mostly based on questionable correlations between occurrences and the climate. We used a process-based phenology model to predict the native and invasive range margins of common ragweed, a damaging weed with extremely allergic pollen. Our results show that integrating phenology into distribution models will be critical for the mechanistic modelling of range dynamics.

10:00 Thursday 20th December 2012

TT7.5

Butterfly phenology varies less with temperature across latitude than over time, suggesting regional adaptations to local climate

David B Roy (NERC Centre for Ecology and Hydrology), Tom H Oliver (NERC Centre for Ecology Hydrology), Albert B Phillimore (Institute of Evolutionary Biology University of Edinburgh), Marc S Botham (NERC Centre for Ecology Hydrology), Bjorn Beckmann (NERC Centre for Ecology Hydrology), Tom Brereton (Butterfly Conservation), Roger LH Dennis (Staffordshire University), Colin Harrower (NERC Centre for Ecology Hydrology), Jeremy A Thomas (Department of Zoology University of Oxford)

We analysed 78,497 flight dates of 27 UK butterflies, over 31 years of standardised monitoring, to quantify the latitudinal and temporal relationships with temperature. All species showed a strong correlation between phenology and temperature over time - earlier emergences in warmer years. However, temperature-related variation in phenology was significantly greater over time than over space suggesting strong local adaptation.

10:15 Thursday 20th December 2012

TT7.6

How does temperature influence the phenology of crucifer plant species, a main herbivore species and their interaction along a latitudinal gradient in Sweden?

Tenna Toftegaard (Department of Botany Stockholm University), Diana Posledovich (Department of Zoology Stockholm University), Karl Gotthard (Department of Zoology

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Stockholm University), Christer Wiklund (Department of Zoology Stockholm University), Johan Ehrlén (Department of Botany Stockholm University)

Climate change can influence the strength of species interactions by altering the phenology of the species involved. We investigated how temperature influences the phenological matching between several crucifer species (*Brassicaceae*), and one of their main herbivores (the Orange tip butterfly; *Anthocharis cardamines*) along a south-north latitudinal gradient in Sweden. We used experimental studies with four different temperature treatments.

10:30 Thursday 20th December 2012

TT7.7

A geographic mosaic of species' association driven by plant/insect phenological asynchrony

Michael C Singer (Plymouth university), Carolyn S McBride (University of Arizona), Camille Parmesan (Plymouth university)

Conspecific butterfly populations (*Euphydryas editha*) were faced with a choice of ovipositing on a chemically-defended, long-lived host, *Pedicularis*, or on a phenologically-defended ephemeral host, *Collinsia*. At sites where *Collinsia* lifespan was relatively long, the insects evolved monophagy on *Collinsia* despite resulting mortality and phenological stress. Where the lifespan of *Collinsia* was shorter, the butterflies had evolved preference for *Pedicularis*.

11:45 Thursday 20th December 2012

TT7.8

The contributions of plasticity and local adaptation to first egg dates of some British birds

Albert Phillimore (University of Edinburgh), Dave Leech (British Trust for Ornithology), James Pearce-Higgins (British Trust for Ornithology), Jarrod Hadfield (University of Oxford)

The long-running BTO nest record scheme comprises thousands of observations of first egg dates spanning many locations and species. I will show how we can use these data to identify the time-windows over which the phenology of different species is most sensitive to temperature and separate the contributions that plasticity and local adaptation make to geographic variation in phenology.

12:00 Thursday 20th December 2012

TT7.9

Avian long-distance migrants adapt to climate change after a period of intensified selection on breeding time

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Christiaan Both (University of Groningen), Lars Gustafsson (University of Uppsala), Jaime Potti (Estacion Biológica de Doñana (CSIC)), Leonid V Sokolov (Biological station Rybachy), Janos Tóth (Eötvös University Budapest), Wolfgang Winkel (6 Institute of Avian Research Vogelwarte Helgoland), Marcel E Visser (Netherlands Institute of Ecology)

A major concern about climate change is that reproductive timing gets increasingly mismatched with timing of food. Here we use long-term trends in selection on breeding date (1980-2008) from six populations of *Ficedula* flycatchers across Europe to evaluate fitness consequences of increased mismatches. Interestingly, selection intensified from 1980-1995, but thereafter relaxed again. This suggests recent adaptation to increased spring temperatures.

12:15 Thursday 20th December 2012

TT7.10

Reassessing the Determinants of Breeding Synchrony in Ungulates

Nathalie Pettorelli (Institute of Zoology), Annie English (Imperial College London), Alienor LM Chauvenet (Imperial College London), Kamran Safi (Max Planck Institute)

This study makes use of a satellite-based index of resource availability to explore how the level of seasonality and inter-annual variability in resource dynamics can affect birth season length of ungulate populations. Our findings provide new insights into the evolution of breeding synchrony in terrestrial mammals, enhancing our ability to predict the potential impacts of climate change on biodiversity.

12:30 Thursday 20th December 2012

TT7.11

The relationship between carbon dioxide uptake and canopy colour from two camera systems in a deciduous forest in southern England

Toshie Mizunuma (The University of Edinburgh), Matthew Wilkinson (Forest Research), Edward L. Eaton (Forest Research), Maurizio Mencuccini (The University of Edinburgh), James I. L. Morison (Forest Research), John Grace (The University of Edinburgh)

To assess the influence of canopy phenological state on CO₂ flux, we installed two different digital camera systems on a flux measurement tower in an oak-dominated forest in southern England over two growing seasons. We modelled daily Gross Primary Productivity (GPP) using the extracted colours to compare with the flux measurements and found the strong relationship between GPP and Hue.

12:45 Thursday 20th December 2012

THEMATIC TOPIC: INSECT POLLINATION: LAND-USE DISEASE

PESTICIDES AND ECOSYSTEM SERVICES

TT8.1

Multiple pressures on pollinators and their consequences for crop production

Alexandra M Klein (Leuphana University)

The loss of plant flower resources through agricultural intensification change flower-visiting communities with consequences for crop production. I will show how land use and environmental changes interact and how diverse pollinator communities can buffer pollination services using case studies like almond pollination in California and general patterns in global crop pollination analyses.

09:00 Thursday 20th December 2012

TT8.2

Towards Sustainable Pollination Services for UK Crops

Michael Garratt (University of Reading), Chiara Polce (University of Leeds), Andrew Challinor (University of Leeds), Mette Termensen (University of Leeds), Giles Budge (FERA), Nigel Boatman (FERA), Stuart Roberts (University of Reading), Ayenew Endalew (University of Leeds), Simon Potts (University of Reading), Koos Biesmeijer (University of Leeds)

The productivity of many UK crops is dependent on insect pollinators. We have quantified the contribution of a range of pollinators to crop yield and quality and identified where there are deficits in pollination. We have investigated the ecological and socio-economic drivers of pollination service supply to agriculture with the aim of developing mitigation practices to reduce pollination deficits.

09:30 Thursday 20th December 2012

TT8.3

Landscape heterogeneity and land-use effects on pollinator diversity and space use

Mark A Gillespie (University of Leeds), Mathilde Baude (University of Bristol), Jacobus Biesmeijer (University of Leeds), Nigel Boatman (Food and Environment Research Agency), Andrew Bourke (University of East Anglia), Giles Budge (Food and Environment Research Agency), Claire Carvell (NERC Centre for Ecology and Hydrology), Stephanie Dreier (Institute of Zoology Zoological Society of London), Matthew S Heard (NERC Centre for Ecology and Hydrology), William E Kunin (University of Leeds), Jane Memmott (University of Bristol), Dan Morton (NERC Centre for Ecology and Hydrology), Phil Northing (Food and Environment Research Agency), Simon Potts (University of Reading), Stuart Roberts (University of Reading), Claire Rowland (NERC Centre for Ecology and Hydrology), Deepa Senapathi (University of Reading), Simon Smart (NERC Centre for

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Ecology and Hydrology), Kate Somerwill (Food and Environment Research Agency), Seirian Summer (Institute of Zoology Zoological Society of London), Jinliang Wang (Institute of Zoology Zoological Society of London), Claire Wood (NERC Centre for Ecology and Hydrology)

Two landscape scale studies into insect pollinator populations are described: 1) Using a combination of molecular genetics, field studies and modelling, links between space use of bumblebees and habitat structure are investigated; 2) Using historical data and countrywide fieldwork, the links between insect pollinator populations and patterns of land management are examined.

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TT8.4

Pathogen impacts across bee species and biological scales

Dino P McMahon (Queen's University Belfast), James T Murray (Trinity College Dublin), Robert J Paxton (Martin-Luther-Universität Halle-Wittenberg), Stephan Wolf (Rothamsted Research), Juliet L Osborne (University of Exeter), Matthias A Fürst (Royal Holloway University of London), Mark JF Brown (Royal Holloway University of London), John Bryden (Royal Holloway University of London), Vincent AA Janzen (Royal Holloway University of London), Tobias C Olofsson (Lund University), Alejandra Vasquez (Lund University), Giles Budge (Fera National Bee Unit), Nigel J Borroughs (University of Warwick), Eugene V Ryabov (University of Warwick), David J Evans (University of Warwick)

We present findings from theoretical, laboratory and field experiments investigating the impact of emerging pathogens on honeybees and bumblebees. We focus on Deformed Wing Virus and Nosema ceranae, and report molecular analyses of contemporary virus populations, pathogen responses in hosts and marker discovery for resistance against Varroa and associated viruses

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TT8.5

Pesticide impacts on bees: from neurons to colonies

Mary J Palmer (University of Dundee), Richard Gill (Royal Holloway University of London), Sally Williamson (Newcastle University), Jenni Harvey (University of Dundee), Neil Millar (University College London), Nigel Raine (Royal Holloway University of London), Geraldine Wright (Newcastle University), Christopher Connolly (University of Dundee)

Using a multidisciplinary approach, we show that exposure to field-realistic (sublethal) concentrations of widely-used pesticides and in-hive miticides impairs bee performance at neuronal, behavioural and colony levels. Exposure to combinations of pesticides can produce more severe detrimental effects, suggesting that environmental exposure to multiple pesticides may be a significant contributor to bee population declines.

10:15 Thursday 20th December 2012

TT8.6

Impacts of neonicotinoid pesticides on bumblebees

David Goulson (University of Stirling)

Controversy rages over the safety of neonicotinoid pesticides, in particular with regard to their impacts on bees. I discuss recent evidence which suggests that this class of pesticide may be having major and hitherto unappreciated impacts on bumblebees, probably in part mediated by disruption of their ability to navigate and gather food for the colony.

11:30 Thursday 20th December 2012

TT8.7

Pollinators in an urbanized world: how do urban habitats compare to farms and nature reserves?

Katherine Baldock (University of Bristol), Koos Biesmeijer (University of Leeds), Mark Goddard (University of Leeds), Damien Hicks (University of Edinburgh), Bill Kunin (University of Leeds), Nadine Mitschunas (University of Reading), Lynne Osgathorpe (University of Bristol), Simon Potts (University of Reading), Anna Scott (University of Reading), Graham Stone (University of Edinburgh), Jane Memmott (University of Bristol)

In this study, funded by the Insect Pollinators Initiative, we are assessing the value of urban habitats for insect pollinators. We are addressing three questions: 1. Where is the UK's pollinator biodiversity: urban habitats, farmland or nature reserves? 2. Where are the hotspots of pollinator biodiversity in urban areas? 3. How can we help conserve pollinators in urban areas?

11:45 Thursday 20th December 2012

TT8.8

What do we still need to know, to conserve wild insect pollinators?

Lynn V Dicks (University of Cambridge), William J Sutherland (University of Cambridge)

We convened a group of conservation practitioners and scientists, including representatives from the food and farming industries, NGOs and conservation agencies, to identify the most important knowledge needs relating to conservation of wild insect pollinators in the UK. Basic pollinator ecology, economic benefits of crop pollination and impacts of pesticides emerged strongly as priorities.

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TT8.9

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Combined pesticide exposure severely impacts individual- and colony-level traits in bees

Richard J. Gill (Royal Holloway University of London), Richard J. Gill (Royal Holloway University of London), Oscar Ramos-Rodriguez (Royal Holloway University of London), Nigel Raine (Royal Holloway University of London)

Foraging bees visit a variety of crops exposing them to multiple pesticide combinations. We investigated the impact of chronic exposure to field-realistic levels of two pesticides on the behaviour and success of 40 bumblebee colonies. We found sublethal effects on foraging behaviour leading to reduced colony performance. Moreover, simultaneous exposure to both pesticides increased the propensity of colonies to fail.

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EVOLUTIONARY ECOLOGY

19.1

Character displacement, character release and speciation in *Mnais* damselflies.

Stewart J Plaistow (University of Liverpool), Yoshitaka Tsubaki (CER Kyoto)

Polymorphism may play a role in speciation, but how morphs diversify into independent lineages is unclear. The alternative adaptation hypothesis predicts that 'developmental character release', generated by the loss of a morph, plays a key role. We test this hypothesis by comparing body size and wing shape in closely related damselflies that co-exist as either polymorphic or monomorphic populations.

09:00 Thursday 20th December 2012

19.2

Ecological character displacement in a pair of White-eyes (*Zosteropidae*) on remote Indonesian islands

Seán B. A. Kelly (Trinity College Dublin), David J. Kelly (Trinity College Dublin), Nicola M. Marples (Trinity College Dublin)

Ecological character displacement - understood as competition-driven changes in phenotype that allow for reduced levels of interspecific competition - is a phenomenon rarely described in vertebrate species. From analyses of simple morphometric measurements, we report an observed case of character displacement (and competitive release) between two White-eye *Zosteropidae* species present on the Wakatobi archipelago, Southeast Sulawesi, Indonesia.

09:15 Thursday 20th December 2012

19.3

Ecological effects of evolutionary maladaptation in a Californian stick insect

Timothy E Farkas (University of Sheffield), Tommi Mononen (University of Helsinki), Aaron A Comeault (University of Sheffield), Ilkka Hanski (University of Helsinki), Patrik Nosil (University of Sheffield)

Evolutionary maladaptation is a potential consequence of gene flow between locally adapted populations and is ubiquitous in nature. However, the importance of gene flow maladaptation as drivers of ecological patterns and processes is poorly understood. Using both observational and experimental field methodology, we demonstrate that maladaptation can regulate insect herbivore populations, structure plant-arthropod communities, and determine rates of herbivory.

09:30 Thursday 20th December 2012

19.4

Bedroom choice in flower visiting insects

Allan G Ellis (Stellenbosch University), John S Terblanche (Stellenbosch University), Susana Clusella-Trullas (Stellenbosch University)

Many flower-visiting insects overnight inside flowers. A few studies have suggested that some plants have adapted to exploit sleeping insects for pollination in return for a heat reward. Here we examine bedroom choice of pollinators in a South African desert plant community in relation to their thermal requirements and the thermal properties of their floral boudoirs.

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19.5

A study of differential allocation in Chinese painted quail based on male secondary sexual characteristics.

Christina M Coakley (University of Edinburgh), Emma JA Cunningham (University of Edinburgh)

Here we examine the impact on female Chinese painted quail paired with males of varying badge size and boldness scores on their investment in a clutch. In this study we found significant evidence for alterations in investment between groups. We also explore the relationship between these traits and embryos sex at 5 days of incubation.

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19.6

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Consequences of evolving to flower early

Anne C Priest (University of Bath), Paula Kover (University of Bath)

Warmer temperatures have led to changes in phenological timing including earlier flowering. The objective of our study was to get a better understanding of how the timing of flowering affects the development of *Arabidopsis thaliana* by comparing the developmental strategy of plants that had been selected to flower early under two different growth conditions.

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19.7

Does nest-drifting behaviour assure inclusive fitness of helpers in tropical paper wasps?

Seirian Sumner (Bristol University), Thibault Lengronne (Institute of Zoology ZSL), Laurent Keller (University of Lausanne)

The evolution of helping behaviour in eusocial animals can be explained by the kin-selected benefits of raising relatives. Nest-drifting behaviour, where helpers visit multiple nests, may challenge this. Using radio-tags to monitor nest-drifting and helping effort in tropical paper wasps, we show that helpers respond to the needs of their natal nest, assuring inclusive fitness for themselves and their relatives.

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19.8

Population genetic consequences of collective dispersal

Jon Yearsley (University College Dublin), Frederique Viard (Station Biologique de Roscoff), Thomas Broquet (Station Biologique de Roscoff)

Collective dispersal is the correlated dispersal of two or more individuals. Collective dispersal is observed (e.g. marine larval dispersal, wind driven seed dispersal) but has received little attention in population genetic theory. We present theory that incorporates collective dispersal into estimates of F_{ST} and expected coalescence times and discuss links with anisotropic dispersal.

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19.9

Senescence and terminal investment: Age-specific reproduction in the wandering albatross

Hannah Froy (University of Edinburgh), Daniel H Nussey (University of Edinburgh), Sue Lewis (University of Edinburgh), Richard A Phillips (British Antarctic Survey)

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Age-related variation in reproductive success has significant consequences for ecological and evolutionary dynamics. We use a 30 year longitudinal dataset to characterise age-specific breeding success in the wandering albatross. We then examine the complex processes underpinning this age-related demographic variation, statistically dissecting the population-level patterns to reveal independent contributions of breeding experience, senescence and terminal investment.

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19.10

Serpentine driven adaptation in a widespread fungal species

Elizabeth C. Bourne (Freie Universität Berlin Institut für Biologie - Botanik Germany), Ludo H.A. Muller (Freie Universität Berlin Institut für Biologie - Botanik Germany), Susana C. Gonçalves (Centro de Ecologia Funcional Universidade de Coimbra Portugal)

Serpentine soils are high in heavy metals and low in important plant nutrients. As such they represent an excellent system for studying local adaptation processes for species occurring both on and off these soils. Using a combination of liquid culture phenotyping and population genetic characterisation we reveal evidence for soil driven local adaptation in the ectomycorrhizal fungus *Cenococcum geophilum*.

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19.11

Sex, cold and selfish genes: what causes the latitudinal clines in meiotic drive?

Tom Price (University of Liverpool)

If an X chromosome in a male kills his Y chromosome gametes, it results in all female broods. Unless stopped, these selfish chromosomes should spread until they drive the population extinct. However, in nature meiotic drivers are found in stable latitudinal clines, being rarer at higher latitudes, despite occurring in species with very different ecologies. This talk asks why.

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19.12

The effects of floral sex organ position on pollen dispersal

Shane A Richards (Durham University), Lawrence D Harder (University of Calgary), Spencer CH Barrett (University of Toronto)

The positions of anthers and stigmas should govern pollen dispersal in animal-pollinated plants. *Pontederia cordata* is tristylous, so that sex organs appear at three positions:

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protuding, at the perianth mouth, and at the perianth base. We tracked pollen movement in this species and found that pollen exchange is generally greatest for the mid-positioned organs when pollinators are abundant.

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19.13

The Evolution of Specialization in a Pollinator-Plants-Herbivore System and its Ecological Consequences

Grigoris Kylafis (University Paris 6), Nicolas Loeuille (University Paris 6)

The study of the evolution of ecological specialization in more complex systems than pairwise ones is a challenge. We model a pollinator-plants-herbivore system wherein the strength of antagonistic interactions and the strength of mutualistic ones are considered to coevolve. We investigate the evolution of specialization in this system and highlight its feedback effects on pollination services.

12:30 Thursday 20th December 2012

19.14

The quantitative genetics of local adaptation to predation risk

Andrew P Beckerman (Univeristy of Sheffield), Julia Reger (University of Sheffield)

Predation is a major force structuring ecological communities. Predation is also responsible for the evolution of phenotypic plasticity in many organisms. Here, combining a naturally replicated experiment varying predator regime with a laboratory experiment focused on predator induced phenotypic plasticity, we show how this plasticity is central to local adaptation at a landscape scale.

12:45 Thursday 20th December 2012

19.15

Understanding ecological and phylogeographic relationships within a highly polymorphic cichlid species

Isabel S Magalhaes (Natural history museum csic spain)

Existence of morphologically distinct forms of a cichlid species in several independent lagoons in Northern Mexico presents an ideal system to look at how traits evolve in parallel. Using ecological, genetic and morphological data we found genetically distinct populations among lagoons and resource partitioning within lagoons. This constitutes strong evidence of divergent selection underlying the radiation of this cichlid assemblage.

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19.16

Why negative maternal effects maximise fitness in relatively stable environments

Thomas HG Ezard (University of Southampton), Rebecca B Hoyle (University of Surrey)

Using a quantitative genetic model of adaptation by genetic assimilation, phenotypic plasticity and maternal effects, we examine the impacts of auto-correlated environmental change. If environmental change is extreme or predictable across generations, positive maternal effects are beneficial. In relatively stable environments, negative maternal effects minimise phenotypic variance, keep more individuals close to the target phenotype and therefore maximise fitness.

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FOREST ECOLOGY

21.1

Insects and plant pathogens as agents of density-dependence in tropical forest trees

Owen T Lewis (Lewis), Sofia Gripenberg (University of Turku), Robert Bagchi (University of Durham), Rachel E Gallery (University of Arizona), Lakshmi Narayan (University of California Berkeley), Robert P Freckleton (University of Sheffield)

The coexistence of plant species in diverse tropical forests can be promoted by specialised enemies that act in a density-dependent manner. Density-dependent seedling survival is widely observed but its causes have rarely been identified. In Belize we used pesticides to test whether insects and plant pathogens cause density-dependent seedling recruitment and survival, and assessed the consequences for plant diversity and composition.

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21.1

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pesticides to test whether insects and plant pathogens cause density-dependent seedling recruitment and survival, and assessed the consequences for plant diversity and composition.

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21.2

The structure of tropical rainforests: what can we learn from tree size distributions?

Franziska Taubert (Helmholtz Centre for Environmental Research - UFZ), Hans-Jürgen Dobner (University of Applied Science (HTWK) Leipzig), Andreas Huth (Helmholtz Centre for Environmental Research - UFZ)

The high biomass of tropical rainforests is closely related to their structure and dynamics, often characterized by their stem size distribution. We apply statistical as well as geometrical 'crown packing' methods for analysing these distributions using field data from tropical forests. Results indicate the rejection of the widely-spread assumption of power-law distributed stem sizes.

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21.3

Climate seasonality and ENSO influence flowering and fruiting phenology in a Brazilian cerrado

Irene Mendoza (UNESP), M. Gabriela G. Camargo (UNESP), Paula Reys (IF Goiano), L. Patricia C. Morellato (UNESP)

Brazilian cerrados are key indicators of responses of tropical vegetation to climate change. We present 7 years of reproductive phenology of a cerrado community, with a seasonal pattern of flowering (end of dry season) and fruiting (wet season). ENSO events interacted with seasonality, El Niño years decreased flower and fruit production and modified timing of phenophases at the community level.

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21.4

Combining ongoing timber production with ecological restoration of Plantations on Ancient Woodland Sites (PAWS): opportunities, challenges and techniques.

Scott McG. Wilson (Consultant Forester and Forest Ecologist Aberdeen)

Restoration of Plantations on Ancient Woodland Sites (PAWS) towards native composition has been prioritised in British forestry practice over recent years. However, it is often regarded as being incompatible with continued economic timber production, deterring many woodland owners and managers from active PAWS restoration. This paper reports case-study examples showing how ecological restoration and timber production can be

effectively combined.

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21.5

Floral changes in Wytham Woods 1974-2012

Keith J Kirby (Department of Plant Sciences Oxford)

Permanent plots established in 1974 in Wytham Woods have been recorded at roughly decadal intervals since, most recently in 2011-12. The mean species richness across the whole set has not changed, but there has been considerable turnover of species at the plot level related to changes in canopy cover and deer grazing levels.

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21.6

Human-induced trophic cascade in a fecal detritus food web

Elizabeth Nichols (Lancaster University Universidade de São Paulo), María Uriarte (Columbia University), Carlos Peres (University of East Anglia), Julio Louzada (Universidade Federal de Lavras), Whaldner Endo (Norwegian University of Life Sciences), Rodrigo Braga (Universidade Federal de Lavras), Gustavo Schiffler (Universidade Estadual de Campinas), Sacha Spector (Scenic Hudson)

We conducted a landscape-level assessment of human regulation of a fecal-detritus food web in the Brazilian Amazon, coupling data on human impact, mammal and dung beetle communities, and secondary seed dispersal. Human impact correlated with decreased game primate abundance and beetle biomass, though did not influence seed burial. Cascade strength was mediated by both forest type and beetle species traits.

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21.7

From trees and climates of the last century to modelling future european mixed forests

Friedrich J. Bohn (Center of Environmental Research - UFZ), Karin Frank (Center of Environmental Research - UFZ), Andreas Huth (Center of Environmental Research - UFZ)

We adapt the individual based gap model FORMIND to the temperate zone to model mixed central European forest stands. We parameterize eight tree species by data of yield tables and trait databases under a reference climate of the area and time of the yield tables. Our model generates realistic simulations of forest biomass and basal area for Germany and France.

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21.8

The influence of tree species on soil infiltration capacity

Kathy Chandler (Lancaster University), Carly Stevens (Lancaster University), Andrew Binley (Lancaster University), Aidan Keith (CEH Lancaster), Richard Bardgett (Lancaster University)

Little is known about how tree species alter soil infiltration capacity, despite increasing use of tree buffer zones and woodland to protect water quality and reduce erosion. We compared influence of a broadleaf and conifer species, investigated processes involved, including interaction with soil macrofauna, and discuss implications for land management.

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21.9

Fragmentation of tropical forests and its impact on the global carbon cycle

Andreas Huth (Helmholtz Centre for Environmental Research - UFZ Leipzig), Sandro Puetz (UFZ – Helmholtz Centre for Environmental Research Leipzig), Jørgen Groeneveld (Helmholtz Centre for Environmental Research - UFZ Leipzig), Klaus Henle (Helmholtz Centre for Environmental Research - UFZ Leipzig), Christoph Knogge (IPÊ Institute for Ecological Research Brazil), Alexandre C Martensen (Taki Ambiental Brazil), Markus Metz (University of Ulm Germany), Jean P Metzger (University of Sao Paulo Brazil), Milton C Ribeiro (Universidade Estadual Paulista Brazil)

Deforestation and logging of tropical forests have been identified as major sources of CO₂ emissions. In contrast, the fragmentation processes that act on forests, causing increased tree mortality at fragment edges, have been largely overlooked. In this study we analyse the long-term carbon loss due to fragmentation of tropical forests by combining inventory data, remote sensing and ecological modelling.

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21.10

Tree-rings mirror management legacy: growth and regeneration of oak standards in coppice woodlands

Radim Hédl (Institute of Botany Czech Academy of Sciences), Jan Altman (Institute of Botany Czech Academy of Sciences), Péter Szabó (Institute of Botany Czech Academy of Sciences), Martin Kopecký (Institute of Botany Czech Academy of Sciences), Jana Müllerová (Institute of Botany Czech Academy of Sciences), Vladan Riedl (Institute of Botany Czech Academy of Sciences)

Effects of coppicing on growth and regeneration of oak standards has been rarely studied. We have found significant releases in oak standards after historically documented

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coppicing events, substantial mature oaks recruitment during the period of coppicing management and significant competition between oaks and coppiced underwood. Maintenance of oaks apparently depends on clearings large enough to enable the species to regenerate.

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21.11

Global Change effect on the endemic Mediterranean *Juniperus thurifera* woodlands

Lucía DeSoto (Universidade de Coimbra), Jesús J Camarero (Instituto Pirenaico de Ecología. Consejo Superior de Investigaciones Científicas), Marcelino De la Cruz (Universidad Politécnica de Madrid), Jose M Olano (Universidad de Valladolid), Vicente Rozas (Misión Biológica de Galicia. Consejo Superior de Investigaciones Científicas)

Changes in land use and climate are the major drivers of Global Change. We evaluated the effect of both climatic constraints and traditional livestock abandonment on the *Juniperus thurifera* woodland growth. We found a spatial structured non-stationary response to global warming within the species range and a rapid ecosystem change in composition and structure when herbivory was locally reduced.

12:00 Thursday 20th December 2012

21.12

Quantifying the impact of lianas on the carbon balance of tropical forests

Geertje MF Van der Heijden (University of Wisconsin-Milwaukee Smithsonian Tropical Research Institute), Jennifer S Powers (University of Minnesota), Stefan A Schnitzer (University of Wisconsin-Milwaukee Smithsonian Tropical Research Institute)

Using an extensive liana removal experiment, we provide the first forest-level estimate of the impact of lianas on the carbon balance of tropical forests. During the first dry season, carbon uptake of trees in liana-free plots was 1.14 Mg ha^{-1} , compared to 0.64 Mg ha^{-1} in control plots. Lianas therefore reduced forest-level tree carbon uptake by 0.50 Mg ha^{-1} .

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21.13

Restoring and expanding upland birchwoods in the Scottish Highlands by managing red deer

Andrew J Tanentzap (York University), James Zou (Harvard University), David A Coomes (University of Cambridge)

Predicting the outcome of deer culling, aimed at improving habitat conservation value, is difficult. We develop the first spatially-explicit simulation model to predict the functional responses of birch (*Betula* spp.) woodland to land-management in the Scottish Highlands.

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We use the model's predictions to discuss how managers may increase birch regeneration.

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HERBIVORE – PLANT INTERACTIONS

24.1

Do grasses bite back? The role of silica in plant defence against herbivores.

Sue E Hartley (University of York)

Understanding the interactions between grasses and herbivores is central to the conservation of species-rich grasslands and the protection of our most important crops against pests. This talk will show how and why silica is an effective anti-herbivore defence in grasses, its potential impact on herbivore populations and how silica could be useful in sustainable methods of crop protection in future.

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24.2

Go with the flow: seasonal changes in water velocity determine foraging patch choice by mute swans

Kevin A Wood (Bournemouth University), Richard A Stillman (Bournemouth University), Francis Daunt (Centre for Ecology and Hydrology), Matthew T O'Hare (Centre for Ecology and Hydrology)

Herbivorous waterfowl move seasonally between aquatic and terrestrial feeding areas, but the factor(s) regulating these switches are poorly understood. We use optimal foraging models to show that seasonal changes in metabolic foraging cost, but not food quantity or quality, determine a mute swan habitat shift between riparian pasture and river. Few studies currently consider such inter-habitat differences in foraging costs.

09:15 Thursday 20th December 2012

24.3

Identifying the critical climatic time windows that affect plant productivity and red deer performance in the Isle of Rum.

Ana I Bento (Imperial College London), Michael J Crawley (Imperial College London)

Using long-term data for red deer and vegetation in Rum, we identify climatic windows explaining most phenological variation in deer demography and vegetation productivity. Our results suggest that most weather effects on deer condition are felt indirectly through

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variation in plant growth. Nevertheless, the upward trend observed in plant productivity, is not matched by an increase in the deer population.

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24.4

Pea aphid facultative symbiont interactions at the community level

Enric Frago (University of Oxford), Marcel Dicke (Wageningen University), Charles Godfray (University of Oxford)

Pea aphid facultative symbionts are known to have striking effects on their hosts including changes in colour and protection from natural enemies or heat shocks. In a field experiment, we have found that aphids with or without the symbiont *Hamiltonella defensa* differ in their effects on plant quality with consequences for the community of other herbivores naturally-colonizing our experimental plots.

09:45 Thursday 20th December 2012

24.5

Shoots, roots and carbon: changing soil carbon inputs in grazed upland grasslands

Stuart W Smith (University of Aberdeen), Sarah Woodin (University of Aberdeen), Robin J Pakeman (The James Hutton Institute), David Johnson (University of Aberdeen), René Van der Wal (University of Aberdeen)

The impact of livestock grazing on grass tussock carbon stocks and grass root decomposition was studied in a landscape-scale upland grazing experiment. High sheep densities reduced tussock number and thereby vegetation carbon stocks, but grazing had little effect on root decomposition. The long-term consequences for soil carbon have been modelled.

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24.6

Testing the evolutionary enlistment hypothesis: are there benefits for plant fitness?

Rieta Gols (Wageningen University), Jeffrey Harvey (NIOO The Netherlands), Marjolein Kruidhof (NIOO The Netherlands), Erik Poelman (Wageningen University)

It has been suggested that natural enemies such as parasitoid wasps can benefit plant fitness by reducing herbivore damage. However, thus far, evidence supporting this position is scarce. Here in lab and semi-field experiments, we compare seed production and viability in a tritrophic system involving a solitary and a gregarious parasitoid and their shared host.

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24.7

The effects of tree provenance on a community of gall-forming herbivores: implications for adaptive forest management

Frazer H Sinclair (University of Edinburgh), Graham Stone (University of Edinburgh), Stephen Cavers (Centre for Ecology and Hydrology), James A Nicholls (University of Edinburgh), Alexis Ducouso (Institut National de la Recherche Agronomique (INRA)), Rémy Petit (Institut National de la Recherche Agronomique (INRA)), Antoine Kremer (Institut National de la Recherche Agronomique (INRA)), Karsten Schönrogge (Centre for Ecology and Hydrology)

It has been suggested that negative effects of climate change on forest health could be mitigated by planting trees of non-local provenance that are adapted to predicted future climates. We investigate the importance of tree provenance for associated organisms using a model system of gall-forming herbivores (Hymenoptera: Cynipidae) on Sessile oak (*Quercus petraea*), at an experimental plantation in northwest France.

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24.8

Something in the air: Seedling volatiles and anti-herbivore defence

Mick Hanley (Plymouth University), Robbie Girling (University of Southampton), Emma Olliff (Plymouth), Anne-Emmanuelle Felix (Plymouth), Phil Newland (Southampton), Guy Poppy (Southampton)

Although seedling selection by herbivores is linked to constitutive chemical defences, it remains unclear whether herbivores detect these defences prior to attack despite the presumably pressing need to signal defensive capability before tissue is damaged. We show here that olfactory selection of seedling material by snails is strongly related to gustatory acceptability and plant age.

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INVASIVE SPECIES

26.1

Morphometric changes in passerine birds introduced to New Zealand from the UK

Tim Blackburn (Institute of Zoology), John Ewen (Institute of Zoology), Becki Lawson (Institute of Zoology), Melanie Monroe (Yale University), Phill Cassey (University of Adelaide)

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We assess whether there have been changes in body size following successful establishment for seven passerine bird species introduced from the UK to New Zealand, using measures taken from individuals from contemporary UK and New Zealand populations, and from historical UK specimens collected around the time that individuals were translocated from the UK.

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26.2

Density and reproduction of common toadflax (*Linaria vulgaris* Mill.) at multiple spatial scales in the native and invasive range.

Laura J Harrison (University of Leeds), Steven GA Compton (University of Leeds), William E Kunin (University of Leeds)

There was no difference in fine scale density between seven invasive Alaskan and twelve native UK toadflax (*L. vulgaris*) populations in climatically matched areas. However, some invasive populations were denser at medium spatial scales. Alaskan ramets were shorter, resulting in lower fruit production, but had no seed predators and produced more viable seed per fruit.

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26.3

A question of invasion: Trematodes in UK freshwater ecosystems

Ellie Sherrard-Smith (Cardiff University), Dr Jo Cable (Cardiff University), Dr Elizabeth A Chadwick (Cardiff University)

Invasive parasitic species can be debilitating to their host populations, but the invasive status of parasites within an ecosystem is sometimes ambiguous. We investigated the invasive status and ecology of two trematodes of otters *Lutra lutra* recently identified in the UK. Both species cause biliary damage to their definitive host.

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26.4

Assessing the potential of remote sensing to map invasive non-native *Rhododendron ponticum*

Sarah L Taylor (Keele University), Ross Hill (Bournemouth University), Colin Edwards (Forest Research)

Spectroradiometry was used to distinguish and characterise the status of invasive non-native rhododendron in open and wooded habitats. The logistic regression model had a 93.5% success rate of distinguishing rhododendron from non-target species. Such data are critical to the development of strategic management programmes to eradicate

rhododendron.

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26.5

Bayesian models in invasive species management

Helen R Bayliss (Harper Adams University College)

Hierarchical Bayesian models can be used to explore probabilistic relationships between a series of random variables and have demonstrated applications to pest species management. Here I explore the use of Bayesian models in invasive species risk assessment and control using topical examples from Great Britain. Bayesian models could provide a useful tool for prioritising invasive species for management.

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26.6

Climate change and aquatic plant invasions in Ireland – which species will benefit the most?

Ruth Kelly (Queen's University Belfast), Alison Cameron (Queen's University Belfast), Christine A. Maggs (Queen's University Belfast), Neil Reid (Queen's University Belfast)

The interactions between climate change and invasive species represent a serious threat to biodiversity. We estimate the current and future potential niches of fifteen high-risk invasive aquatic plant species, based on global climate data, and local environmental and land-use factors. Thus, we identify species most likely to benefit from climate change and areas at highest risk of multiple invasions.

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26.7

Coat of many colours: colour pattern polymorphism and invasion by the harlequin ladybird *Harmonia axyridis*

Helen E Roy (NERC Centre for Ecology and Hydrology), Clare Kessel (University of Reading), Richard Comont (NERC Centre for Ecology and Hydrology), Beth Purse (NERC Centre for Ecology and Hydrology)

The invasive alien harlequin ladybird, *Harmonia axyridis*, is a polymorphic species. Melanic and non-melanic individuals can be found in Britain. The UK Ladybird Survey receives occurrence records of *H. axyridis* including information on colour pattern form. Here we examine the frequency of colour pattern forms, spatially and temporally, and the influence of the different forms on the invasion process.

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26.8

Establishment of non-native plant species distributions in relation to climate and land use in Britain

Alison R Jukes (The University of York), Kevin Walker (Botanical Society of the British Isles), Chris Thomas (The University of York)

The main aim of this project is to determine how climate and land use are affecting the distributions of non-native plants with different levels of establishment in Britain. Current distributions of established species are predicted best by climate variables, while casual and recently introduced species are associated with land use. Future distributions will be modelled using projected climate data.

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26.9

Investigating the status of the UK's non-native population of rose-ringed parakeet (*Psittacula krameri*).

Hannah L Peck (Imperial College London), Ian Owens (Imperial College London), Alex Lord (Imperial College London)

The invasive rose-ringed parakeet has been established in the UK for over 40 years. We provide evidence that whilst the UK's population has exploded over the last 10 years, the London population appears to be reaching its capacity. We examine the population dynamics of this exotic bird, and explore the implications of these findings for management of this globally expanding species.

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26.10

Reported impacts of alien plant species on native plants are based on limited spatial and temporal scales

Miia Jauni (University of Turku), Satu Ramula (Lund University)

We reviewed 87 articles to assess gaps in the research of alien plant species impacts. Most studies evaluated the impact of alien species on one native species in a single habitat or study site over few years. Alien impact studies should cover the whole life-cycle of natives over multiple years, and include several habitat types and study sites.

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26.11

Time and space related Genetic Drift of introduced American Grey squirrels in the

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British Isles

Lisa Signorile (Imperial college London), Chris Carbone (ZSL), Daniel C. Reuman (Imperial College London), Jinliang Wang (ZSL), Peter W.W. Lurz (Lurzengasse 3)

Grey squirrels were initially introduced with just ten squirrels to Woburn Abbey in 1890. They have subsequently spread (with additional introductions) throughout the UK and Ireland. We examine how the genetic diversity and genetic structure of this population has changed across space and time to understand the present population structure.

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26.12

Uneven population expansion of an invasive species influences approaches to management and control - the American mink in Scotland as an example.

Elaine J Fraser (University of Aberdeen), Matthew K Oliver (University of Aberdeen), Gillian Murray-Dickson (University of Aberdeen), David W Macdonald (WildCRU University of Oxford), Xavier Lambin (University of Aberdeen)

This population genetics study demonstrates that spread of the invasive American mink has not been spatially homogeneous and broad habitat differences throughout the invaded range influence expansion rate and direction. Newly established populations share habitat types with source populations but are not panmictic with all populations at comparable latitudes. This has implications for targeting and prioritising management and

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POPULATION ECOLOGY

33.1

Tipping point in the regime shift of hare population cycles attributed to the cumulative effects of early changes in climate and agriculture

Neil Reid (Queen's University Belfast), Robbie A McDonald (University of Exeter), Jon E Brommer (University of Helsinki), Ferdia Marnell (National Parks Wildlife Service Republic of Ireland), Nils C Stenseth (Centre for Ecological and Evolutionary Synthesis (CEES)), W Ian Montgomery (Queen's University Belfast)

During the 20th century the hare population in Ireland exhibited a 'regime shift' from a state where numbers were stable but cyclic with a periodicity of 8 years, to one in which cyclicity was lost and numbers declined dramatically. This was associated with a distinct 'tipping point' linked to early destabilisation of the climate and the onset of agricultural intensification.

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33.2

Density-dependent population responses to multiple stressors: the case of peregrine falcons (*Falco peregrinus*) exposed to two anthropogenic toxicants

Aafke M Schipper (Radboud University Nijmegen), Harrie WM Hendriks (Radboud University Nijmegen), Matthew J Kauffman (U.S. Geological Survey), A Jan Hendriks (Radboud University Nijmegen), Mark AJ Huijbregts (Radboud University Nijmegen)

We incorporated the impacts of two toxicants (DDE and PBDEs) in a stage-based matrix model of a density-dependent peregrine falcon population. At high population densities, toxicant impacts were mitigated by an alleviation of intra-specific competition. This mitigation was absent at low population densities, implying that anthropogenic toxicants may affect wildlife particularly in case of small, hence more threatened populations.

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33.3

Supplementary feeding demonstrates temporal heterogeneity in the importance of food on reproductive success.

Eimear Rooney (Queen's University Belfast), Neil Reid (Quercus), Mathieu G Lundy (Quercus), Hansjoerg P Kunc (Queen's University Belfast), W. Ian Montgomery (Queen's University Belfast)

Different stages of reproduction have different energetic demands and the importance of resource availability is likely to change throughout the breeding season and affect life-history decisions. To test for temporal heterogeneity in limitations set by food supply we carried out a supplementary feeding experiment in the field with the Common buzzard (*Buteo buteo*).

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33.4

Long-term trends and variability in a High Arctic ecosystem: multidimensional analyses of limnic and terrestrial biota.

Lars O Mortensen (Aarhus University), Erik Jeppesen (Aarhus University), Niels Martin Schmidt (Aarhus University), Kirsten S Christoffersen (Copenhagen University), Mikkel P Tamstorf (Aarhus University), Mads C Forchhammer (Aarhus University)

We present an analysis of all major changes observed in abiotic and biotic variables of a limnic and terrestrial biota, within a high Arctic ecosystem in Greenland, over a period of 15 years. Results showed multiple biotic changes, not uniformly distributed across trophic levels and that differ qualitatively and quantitatively between terrestrial and limnic biota.

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33.5

Non-timber forest products harvest affects life history parameters of a tropical tree

Orou G Gaoue (University of Tennessee), Carol Horvitz (University of Miami)

Decades of studies on the ecological impacts of non-timber forest products harvest, reveal that harvest can affect population dynamics. However, effects of harvesting such products on life history traits has been largely ignored. We will discuss the management implications of the effects of foliage and bark harvest on the longevity and age at maturity for African mahogany.

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33.6

Seasonal phenology of interactions involving multivoltine herbivores and their parasitoids

Minghui Fei (Netherlands Institute of Ecology), Rieta Gols (Wageningen University), Jeffrey A Harvey (Netherlands Institute of Ecology)

We studied interactions involving three species of cruciferous plants that exhibit different seasonal phenologies on the development of a multivoltine herbivore, the large cabbage white butterfly, and its gregarious endoparasitoid wasp. We found that the effects on development of the herbivores and its parasitoid differed among the plant species more significantly than across different generations.

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33.7

Tritrophic interactions in the sea: role of information conveying chemicals

Nicola D Lewis (University of Essex), Mark N Breckels (University of Essex), Michael Steinke (University of Essex), Edward A Codling (University of Essex)

The release of chemicals following herbivore grazing on primary producers may provide feeding cues to carnivorous predators. Such tritrophic interactions in the plankton release the climate-relevant gas dimethylsulphide (DMS). Our modelling results indicate that infochemical-mediated tritrophic interactions have important consequences for plankton bloom dynamics, potentially impacting climate and food security.

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BIODIVERSITY MANAGEMENT AND POLICY

41.1

Conservation-development trade-offs and the challenge of translating conservation science into policy: some insights from the Brazilian Amazon

Toby A Gardner (University of Cambridge)

The expansion of agriculture and exploitation of natural forest resources across the tropics presents one of the greatest environmental challenges of the 21st Century. I present the conceptual framework and initial results of the Sustainable Amazon Network (RAS); a multi-disciplinary research initiative involving more than 30 partners assessing both social and ecological dimensions of land-use sustainability in eastern Brazilian Amazonia

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41.2

Collaborative conservation workshops to solve entrenched issues, an integrated approach: A case study on how to reduce the risk of ships accidentally hitting large whales

Richard C Bull (ORCA)

Industry and scientists worked together during a 1.5 day integrated workshop to identify barriers and opportunities to an issue where little progress has been made. Participants identified novel solutions that might not have been possible without industry involvement. We outline key lessons applicable to conservation issues concerning industry and private enterprise.

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41.3

Conservation of endemic floras through adaptive management. The case of Sicily, Malta and their satellite islands

Giuseppe Bonanno (University of Catania)

Adaptive management is proposed as a tool to develop strategies for the conservation of endemic floras. The adaptive approach was applied to the endemic plants from Sicily, Malta and their satellite islands whose biodiversity, IUCN status, and distribution patterns, were analyzed as a preliminary step to set clear goals and conservation priorities.

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41.4

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Conserving the birds of Uganda's Banana-Coffee Arc: Land Sparring and Land Sharing Compared

Mark F Hulme (British Trust for Ornithology), Juliet A Vickery (RSPB), Rhys E Green (University of Cambridge), Ben Phalan (University of Cambridge), Dan E Chamberlaine (University of Turin), Derek E Pomeroy (Makerere University), Dianah Nalwanga (NatureUganda), David Mushabe (NatureUganda), Raymond Katebaka (Makerere University), Phil W Atkinson (British Trust for Ornithology)

Following bird surveys and assessments of agricultural yield we found that more bird species overall, and more with smaller range sizes, would benefit from high-yield farming in Uganda, if used as part of a strategy to reduce forest loss, than from low-yield farming and land sharing. This compares favourably with similar surveys in Ghana and India.

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41.5

Egypt's Protected Area network under future climate change.

Katie Leach (Queen's University Belfast), Samy Zalat (Taibah University El-Ula Branch), Francis Gilbert (University of Nottingham)

Concerns about the impacts of climate change loom large among biodiversity scientists. In this study we use two techniques in conservation science, first, to estimate the likely impacts on the distributions of mammals and butterflies in Egypt (MaxEnt), and second, to measure the effectiveness of Egypt's Protected Area network (Zonation).

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41.6

Heathland management in the New Forest National Park

Barbara Smith (Game and Wildlife Conservation Trust), Tom Birkett (Game and Wildlife Conservation Trust), Dan Carpenter (Natural History Museum)

The New Forest has the largest remaining area of lowland heath in Europe and is important for the diversity of its habitats and associated species. We compared the effects of two management techniques (burning and cutting) on the vegetation and invertebrate communities and discuss the implications for biodiversity conservation and management in the New Forest National Park.

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41.7

Is more stakeholder involvement better for conservation?

Juliette C Young (CEH), Andrew Jordan (UEA), Kate Searle (CEH), Adam Butler (BIOSS),

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Daniel Chapman (CEH), Peter Simmons (UEA), Allan Watt (CEH)

Research on the implementation of Natura 2000 in Scotland found no relationship between stakeholder involvement and expected biodiversity outcomes. Social outcomes of increased stakeholder involvement, such as increased trust, did however increase the likelihood of positive future biodiversity outcomes. The findings indicate key aspects to consider in future efforts aimed at increasing stakeholder involvement in the management of protected areas.

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41.8

Biodiversity conservation and fisheries management

Simon Jennings (Cefas)

Fisheries have wide-ranging impacts on marine biodiversity. Thus the ways that fisheries are conducted and managed will influence progress towards meeting targets for biodiversity conservation and management measures taken to meet biodiversity targets will affect fisheries. We comment on progress and propose some options for providing a reliable, internally consistent and trusted scientific evidence base to inform management decision making.

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41.9

Making ecological research relevant to practitioners

William J Sutherland (University of Cambridge)

There is still a gulf between those involved in research and those involved in practice. Bridging that gap is important for making our research relevant; furthermore there are increasing pressures and incentives to do so, such as the REF. I will describe a range of ways in which this can be achieved by changing both research and practice.

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41.10

LEFT: Local ecological footprinting tool

Peter R Long (University of Oxford), Lizzie Jeffers (University of Oxford), Neil Caithness (University of Oxford), Milo Thurston (University of Oxford), Matthias Smit (Statoil), Christian Collin-Hansen (Statoil), Jurgen Weissenberger (Statoil), Kathy J Willis (University of Oxford)

LEFT is a tool which maps ecological value across landscapes. The website automatically processes high-quality global data to produce 300m resolution maps of land

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cover, numbers of globally threatened terrestrial vertebrate species, beta-diversity of terrestrial vertebrates and flowering plants, habitat fragmentation, habitat connectivity, numbers of migratory species and vegetation resilience.

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41.11

Management without targets: an open-ended approach

Francine M.R. Hughes (Anglia Ruskin University), William M. Adams (University of Cambridge), Peter A. Stroh (Anglia Ruskin University)

Long-term ecosystem behaviour includes continual change at both large and small temporal and spatial scales. In order for habitat management to capture these ecosystem attributes it may be better to adopt an 'open-ended' approach rather than target-driven approaches. This paper will discuss when open-ended management is appropriate and its adoption at the Wicken Fen Vision project in East Anglia.

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41.12

Planning translocations under a changing climate

Alienor LM Chauvenet (ZSL), Nathalie Pettorelli (ZSL), John G Ewen (ZSL), Doug P Armstrong (Massey University), Tim Coulson (Imperial College London)

Climate change is forcing species to shift their range and those not capable of dispersing naturally could be translocated. Selecting suitable sites is paramount for success and habitat suitability modelling can be used to this effect. However, we show that model assumptions and validation should be based on *a priori* understanding of the impact of climate on species' population dynamics.

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41.13

Empowering students through beyond-curriculum fusion of education with research: SERT, The Student Environment Research Team

Anita Diaz (Bournemouth University), Roger Herbert (Bournemouth University), Anna Callum -Anderson (Bournemouth University), Rosie Nicoll (Bournemouth University)

SERT enables teams of undergraduate students to gain and demonstrate experience and skills by leading research in relevant professional practice contexts. SERT teams are led by student managers mentored by academics and professional practitioners. SERT also provides students with a web platform through which to produce living CVs. We present the opportunities and challenges of such a model.

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41.14

The effectiveness of Protected Areas under recent climatic change

Phillipa K Gillingham (Bournemouth University), Chris D Thomas (University of York), Richard B Bradbury (RSPB), David B Roy (CEH), Barbara J Anderson (University of York), John M Baxter (SNH), Nigel AD Bourn (Butterfly Conservation), Humphrey QP Crick (Natural England), Richard A Findon (DEFRA), Richard Fox (Butterfly Conservation), Jenny A Hodgson (University of York), Alison R Holt (University of Sheffield), Mike D Morecroft (Natural England), Nina J O'Hanlon (University of York), Tom H Oliver (CEH), James W Pearce-Higgins (BTO), Deborah A Proctor (JNCC), Jeremy A Thomas (University of Oxford), Kevin J Walker (BSBI), Clive A Walmsley (CCW), Robert J Wilson (University of Exeter), Jane K Hill (University of York)

Several authors have questioned the utility of Protected Areas (PAs) under climatic change, as species may change their distributions away from such locations. We consider northerly- and southerly distributed species within Great Britain, and quantify the effectiveness of PAs across a range of taxa during a period of recent climatic change.

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ECOSYSTEM ECOLOGY AND DYNAMICS

17.1

It has to be worth a try? Individual-based modelling of entire ecosystems, worldwide

Drew W Purves (Microsoft Research), Tim Newbold (Microsoft Research and UNEP-WCMC), Derek P Tittensor (Microsoft Research and UNEP-WCMC), Mike Harfoot (Microsoft Research and UNEP-WCMC), Stephen Emmott (Microsoft Research), Jon Hutton (UNEP-WCMC), Jorn Scharlemann (UNEP-WCMC)

We present The Madingley Model, which simulates how the structure and function of ecosystems emerges from the ecology of individuals. Combining various aspects of ecology (e.g. foraging, metabolism) with a cohort-based approximation, we simulate every organism in each 1 x 1 degree grid-cell on Earth for 1000 years. Do emergent life histories and ecosystem properties look like the real world?

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17.2

Development of a model for ecological forecasting

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Matthew R Evans (Queen Mary University of London), Aristides Moustakas (Queen Mary University of London)

We review the requirements for a model designed to predict future state of a forest ecosystem and draw parallels with models of population dynamics. Good data available on some aspects of forest ecology but there are large gaps. We outline these gaps and discuss how they might be filled. We present results from a model of a deciduous woodland.

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17.3

Beta diversity and species area relationships of forest soil food webs

Christoph Digel (Goettingen University), Franziska Grischkat (Goettingen University), Ulrich Brose (Goettingen University)

We analysed beta diversity, species area relationships and food web structural similarity in 48 soil food webs across forests in Germany. Community similarity decreased with increasing differences of environmental factors and with increasing geographic distance. Beta diversity was more influenced by geographic distance. Food web structure was influenced by environmental factors but not by geographic distance.

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17.4

Enabling a joined-up approach to conservation? Useful metrics from a novel individual-based model of entire ecosystems, worldwide

Michael BJ Harfoot (UNEP-WCMC Microsoft Research), Tim Newbold (UNEP-WCMC Microsoft Research), Derek Tittensor (UNEP-WCMC Microsoft Research), Matthew Smith (Microsoft Research), Jorn Scharlemann (UNEP-WCMC), Drew Purves (Microsoft Research)

Evidence based decision making in conservation requires quantitative forecasts of the impacts of human pressures and the consequences of mitigation actions. We demonstrate several conservation relevant metrics calculated using a novel, individual- and process-based model of global ecosystems. Could such metrics of ecosystem state (e.g. stability, resilience, functional diversity) enable a joined-up approach to conservation?

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17.5

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Environmental metagenetics reveal heterogeneous natural drivers of inter-phylum microbial metazoan diversity in contrasting estuarine ecosystems.

Simon Creer (Bangor University), Delphine Lallias (Bangor University), Jan Hiddink (Bangor University), Simon Neill (Bangor University), Way Sung (Indiana University), Kelley Thomas (University of New Hampshire), Margaret Packer (Natural History Museum London), Natalie Barnes (Natural History Museum London), Tim Ferrero (Natural History Museum London), Neil Hall (Liverpool University), Vera Fonseca (University of Algarve), P John D Lamshead (University of Southampton)

Understanding ecosystems requires synthesis between biodiversity, function and the role of environmental stressors on community assemblages. Here, metagenetic (the meta-molecular genetic analysis of biodiversity) analyses revealed heterogeneous communities and drivers of interstitial microbial metazoan diversity in two contrasting estuarine ecosystems. Accordingly, microbial eukaryotic biodiversity is unlikely to adhere to generalised biodiversity models and is strongly affected by local ecosystem effects.

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17.6

Spatio-Temporal Dynamics of woody species in a heathland to forest succession

Sebastian Kepfer Rojas (University of Copenhagen)

Since a heathland was left to free succession in the late 1800's, the development of the community of woody species has been monitored. Successional pathways and rates are analyzed, both in time and space and in relation to former land use. Furthermore, the effects of dispersal limitation as a driver of community composition is discussed.

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17.7

Subsidies from Saline Lakes to their Catchments - a Spatial and Temporal Stable Isotope Study

Philip M Sanders (Queen Mary University of London), Stephen J Brooks (Natural History Museum), Jonathan Grey (Queen Mary University of London)

The extreme environmental conditions of saline lakes result in 'simple' yet often highly productive aquatic communities which can be an 'oasis' of energy to their typically depauperate catchment. Using $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ isotope ratios we explore the aquatic-terrestrial link from donor soda lake ecosystems via two vectors: periodic, high energy, chironomid emergence; and continuous, low energy, flamingo feather detritus.

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17.8

Productivity of New Zealand indigenous forest does not increase with temperature

David A Coomes (Cambridge), Oliver G Flores (Cirad Reunion), Robert R Holdaway (Landcare Research New Zealand), Emily R Lines (University College London)

It is widely believed that forest productivity is regulated by air temperature. We show that most New Zealand tree species do indeed grow faster in warmer places. However, shifts in forest composition result in stand-level productivity being almost invariant of temperature. We discuss this surprising finding in relation to global patterns of productivity and metabolism.

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FOOD WEBS NETWORKS AND COMPLEXITY

20.1

Trophic groups and modules: two levels of group detection in food webs

Elisa Thébault (UMR 7618 Bioemco CNRS), Benoit Gauzens (UMR 7618 Bioemco CNRS), Gérard Lacroix (UMR 7618 Bioemco CNRS), Stéphane Legendre (UMR 7625 Ecologie et Evolution CNRS)

Historically, food web have been grouped in trophic groups. However, recent algorithms identified modules in food webs. Using a novel algorithm detecting trophic groups, we show that trophic groups are better descriptors of food web structure than modules. We further reveal a hierarchical structure of food webs: modules partition food webs into different energetic pathways, then partitioned into trophic groups.

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20.2

Body size scaling within a competition network

Kristy L Udy (University of Canterbury), Ximena Nelson (University of Canterbury), Jason Tylianakis (University of Canterbury)

Anthropogenic threats influence the structure of interaction networks. Body size can predict predator-prey interactions, but competition is seldom included in ecological

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networks. I observed dung-associated-community interactions in protected and unprotected areas of an Afromontane forest reserve. The competition network structure changed in protected areas of the forest, and the outcome of interactions was influenced by body-size ratios between competitors.

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20.3

Cascading extinctions of carnivores following over-harvesting

Dirk Sanders (University of Bern), Louis Sutter (University of Bern), Frank Van Veen (University of Exeter)

Carnivore species can have positive indirect effects on each other, which increases the persistence of populations. Overharvesting of one carnivore species may therefore lead to cascading extinctions of other carnivores. We demonstrate this effect in experimental insect communities, with carnivore species separated by four trophic links, illustrating a mechanism for horizontal extinction cascades.

12:00 Thursday 20th December 2012

20.4

Interconnecting mutualistic and antagonistic networks: what consequences for the relationships between network structure and community stability?

Alix MC Sauve (CERSP UMR 7204 (MNHN CNRS) Bioemco UMR 7618 (CNRS UPMC ENS IRD AgroParisTech)), Colin Fontaine (CERSP UMR 7204 (MNHN CNRS)), Elisa Thébault (Bioemco UMR 7618 (CNRS UPMC ENS IRD AgroParisTech))

In a theoretical approach, we show the robustness of relationships between network complexity and stability to the interconnection: mutualistic complexity fosters stability, in contrast with antagonistic complexity. These effects are not restricted to each sub-network, as the two sub-networks influence each other through cascading extinctions. Thus, considering interconnection between different network types is key to understanding species persistence.

12:15 Thursday 20th December 2012

20.5

Cheddar - analysis and visualisation of ecological communities in R

Lawrence N Hudson (Imperial College London), Rob Emerson (Concurrent Logic), Gareth B Jenkins (Queen Mary University of London), Katrin Layer (Queen Mary University of London), Mark E Ledger (University of Birmingham), Doris E Pichler (Queen Mary University of London), Murray S A Thompson (Queen Mary University of London), Eoin J O'Gorman (Queen Mary University of London), Guy Woodward (Queen Mary University of London), Daniel C Reuman (Imperial College London)

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We introduce Cheddar - a flexible R package that provides a comprehensive range of food-web analyses and plots, focussing on data that are augmented with estimates of body mass and numerical abundance. This unified package has the potential to improve research efficiency and to serve as a unified framework for future development.

12:30 Thursday 20th December 2012

20.6

Diversity loss at multiple trophic levels - impacts on food web structure.

Órla B McLaughlin (Queen Mary's University London), Eoin J O'Gorman (Queen Mary's University London)

A manipulative field experiment was carried out in Lough Hyne marine reserve to examine the effect of diversity loss at multiple trophic levels. Impacts on species richness, number of trophic links, food chain length and connectance were detected, with the lowest levels occurring after the loss of diversity from just one trophic level.

12:45 Thursday 20th December 2012

20.7

The effect of Large Woody Debris on Stream Community Structure and Ecosystem Functioning

Murray S. A. Thompson (University College London), Stephen Brooks (Natural History Museum), Carl Sayer (University College London), Guy Woodward (Queen Mary University of London), Victoria Warren (Queen Mary University of London)

River habitat enhancement is often used to reinstate ecosystem properties. To test the effectiveness of large woody debris as a restoration tool, five chalk streams were sampled before and after at control and treatment sites. Food web properties including connectance, complexity and allometric scaling have been used to measure community response.

13:00 Thursday 20th December 2012

20.8

Linking traits to species' importance in food webs

Michael J O Pocock (NERC Centre for Ecology and Hydrology)

How can we assess the importance of individual species within ecological networks (e.g. food webs)? Here we demonstrate a novel way of assessing importance and show how the importance of individual plant species relates to their traits. We use field data of a farmland food web with plants and 12 animal guilds and comprising trophic, mutualistic and parasitic interactions.

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13:15 Thursday 20th December 2012

**POSTERS WILL BE DISPLAYED THROUGHOUT THE MEETING IN THE AVON ROOM.
THE POSTER SESSION AND WINE TRAIL WILL BE HELD ON WEDNESDAY 19
DECEMBER 17.15 – 18.45.**

POSTER: POPULATION AND COMMUNITY ECOLOGY

P1.1

Poster Session - Tuesday 18th December 2012

Physical disturbance as a driver of community structure in arbuscular mycorrhizal fungi

Alexander Van den Bos (The James Hutton Institute University of Aberdeen), Jane Davidson (The James Hutton Institute), Alison Bennett (The James Hutton Institute), David Johnson (University of Aberdeen), Tim Daniell (The James Hutton Institute)

Using T-RFLP and selected sequencing we have shown that tillage regime, ranging from zero tillage to deep ploughing, significantly affects the community structure of arbuscular mycorrhizal fungi colonizing barley. There are significant differences with depth in community structure with apparent shallow and deep communities forming. These communities are shaped by tillage with subsequent upward re-colonisation of the deeper community.

P1.2

Poster Session - Tuesday 18th December 2012

Flower constancy altering the outcome of preferential behaviour of pollinator

Jan Smycka (Department of Botany Charles University in Prague), Zdenek Janovsky (Department of Botany Charles University in Prague), Marie Pospiskova (Department of Botany Charles University in Prague), Tomas Herben (Department of Botany Charles University in Prague)

Flower constancy (FC) is a pollinator behaviour that is universal across insect groups, but

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its effects, including interaction with preferential behaviour, are not well understood. We used non-spatial transition matrix model to show that a system with FC discriminates less attractive or rare plant species stronger than system without FC.

P1.3

Poster Session - Tuesday 18th December 2012

A new tool for the rapid determination of insect haemocyte counts reveals performance variation related to diet

Yamini Tummala (University of Lancaster)

Haemocytes are insect immune cells. Traditionally, 'haemocyte counts' are assayed using a haemocytometer, but this method is both laborious and time-consuming. Here we show that the Bio-Rad Automated Cell Counter, designed for counting mammalian cells, is a fast and reliable tool for counting insect haemocytes and that haemocyte counts vary significantly in relation to macronutrient composition of the insect's diet.

P1.4

Poster Session - Tuesday 18th December 2012

Facilitation-competition balance in Mediterranean woody plant communities along a gradient of aridity from southern Spain to Morocco.

Pedro J Rey (Universidad de Jaén), Julio M Alcántara (Universidad de Jaén), Antonio J Manzaneda (Universidad de Jaén), Alfonso M. Sánchez-Lafuente (Universidad de Jaén)

The outcome of the facilitation-competition balance in plant-plant interactions has been proposed to vary along aridity gradients, configuring a humped-back pattern. We tested this pattern using surveys of juvenile-adult association and looking at the relationship between proportion of facilitated species and aridity across 11 woody plant communities and 50 localities conforming an aridity gradient from southern Spain to Morocco.

P1.5

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Poster Session - Tuesday 18th December 2012

Defence-sequestering *Brevicoryne brassicae* aphids reduce the impact of a generalist predator on *Myzus persicae* aphids.

Christopher M Nesbit (Lancaster Environment Centre), Andy Wilby (Lancaster Environment Centre), Mike R Roberts (Lancaster Environment Centre), Rosa Menendez (Lancaster Environment Centre)

Co-evolved specialist herbivores may accumulate plant defence chemicals and sequester them as an anti-predator defence. Although consumption of defence-sequestering prey can be harmful to generalist predators, the impacts on community level interactions are less well understood. Here, we present results showing the presence of defence-sequestering aphids may buffer the regulation of non-sequestering aphids by a shared generalist predator.

P1.6

Poster Session - Tuesday 18th December 2012

Time to grow up! Diversity alone won't make herbivory stable.

Thomas Potter (School of ocean sciences bangor university), Stuart Jenkins (School of ocean sciences bangor university), Luis Gimenez (School of ocean sciences bangor university), Andrew Davies (School of ocean sciences bangor university)

The isopod, *Idotea granulosa*, is a generalist intertidal herbivore exposed to chaotic dynamics from wave action. Survival depends upon attachment to macroalgae of species appropriate to the individual's body size. Thus algal diversity affects the persistence, and complexity, of population structure. Whilst this may beget stability, is diversity the primary cause? Or do temperature, and generation times, govern all?

P1.7

Poster Session - Tuesday 18th December 2012

Resilience of ecosystem functioning to drought in chalk streams

Caroline Mullen (Centre for Ecology and Hydrology University of Birmingham), Francois K Edwards (Centre for Ecology and Hydrology), Mark Ledger (University of Birmingham)

Experimental substrates were used to assess the impact of macroinvertebrate grazers on algal biomass in streams under supra-seasonal drought and during the ensuing recovery

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period. This measure of ecosystem functioning was compared among stream sites of contrasting flow permanence including one site on each stream which was dry during the drought.

P1.8

Poster Session - Tuesday 18th December 2012

Understanding fitness-maximising foraging behaviour of overwintering pied avocets (*Recurvirostra avosetta*)

Kathryn E Ross (Bournemouth University), Richard A Stillman (Bournemouth University), Roger JH Herbert (Bournemouth University)

In accordance with optimal foraging theory, avocets modify their winter foraging strategy in response to spatial and temporal variation in prey availability and numbers of conspecifics, to optimise energy intake. The development of an individual-based model (IBM) to predict the impact of sea-level rise on the avocet population of Poole Harbour is discussed.

P1.9

Poster Session - Tuesday 18th December 2012

Brave pioneers: growth and flowering of plants colonizing glacier forelands in Petuniabukta, Svalbard

Jakub Tesitel (University of South Bohemia), Alexandra Bernardova (University of South Bohemia), Edita Jankova Drdova (Institute of Experimental Botany Academy of Sciences of the Czech Republic), Magdalena Lucanova (Charles University in Prague), Tamara Tesitelova (University of South Bohemia), Jitka Klimesova (Institute of Botany Academy of Sciences of the Czech Republic)

Vegetation development on glacier forelands in the Arctic is a unique example of primary ecological succession in a heavily disturbed environment. Here, we illustrate its mechanisms by an investigation of vegetative growth and investment into flowering in populations of two typical foreland colonizers *Saxifraga oppositifolia* and *Braya purpurascens* on glacier forelands in Petuniabutka, Central Spitsbergen, Svalbard.

P1.10

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Poster Session - Tuesday 18th December 2012

Plant production and soil microbial biomass respond differently to nitrogen forms and nitrogen spatial patterns in a short-term field experiment

Juliette Bloor (INRA), Nianxun Xi (INRA)

We studied effects of nitrogen form (inorganic, organic) and N spatial pattern (patchy, even) on grassland ecosystem function in a factorial field experiment. Unlike aboveground plant biomass, microbial biomass C showed significant N form/ pattern interactions. Comparisons inside/outside patches also indicated that plant and soil responses to patchy N inputs differ with spatial scale.

P1.11

Poster Session - Tuesday 18th December 2012

The paradox of warming

Katarina E Fußmann (Georg-August-Universität), Florian Schwarzmüller (Georg-August-Universität Göttingen), Ulrich Brose (Georg-August-Universität Göttingen), Alexandre Jousset (Georg-August-Universität Göttingen), Björn C Rall (Georg-August-Universität Göttingen)

In order to understand the effects of increasing temperatures on predator-prey interactions, we combined meta-analyses of global databases, bioenergetic modeling and bacterial microcosm experiments. We show that warming stabilizes predator-prey dynamics but increases the risk of predator extinction. Our results suggest a paradigm shift and profound temperature effects for population dynamics.

P1.12

Poster Session - Tuesday 18th December 2012

Fitting scaling laws in ecology: examples from tropical forests

Franziska Taubert (Helmholtz Centre for Environmental Research - UFZ), Florian Hartig (Helmholtz Centre for Environmental Research - UFZ), Hans-Jürgen Dobner (University of Applied Science (HTWK) Leipzig), Andreas Huth (Helmholtz Centre for Environmental Research - UFZ)

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Classification of field data and random measurement errors influence the statistical estimation of assumed scaling laws. We compare different types of maximum likelihood estimation (MLE) using the example of stem size distributions of tropical forests. Results show that MLE methods accounting for such uncertainties are much more robust than others.

P1.13

Poster Session - Tuesday 18th December 2012

Predator wars: the direct & indirect consequences of superpredators entering a predator assemblage.

Sarah R Hoy (University of Aberdeen), Xavier Lambin (University of Aberdeen), Phil Whitfield (Natural Research Ltd), Steve Petty (University of Aberdeen), Martin Davison (Forestry Commission)

Traditionally in community ecology, predators are assumed to be free from predation themselves; however the identification of superpredatory interactions challenges this assumption. The raptor and owl community of Kielder forest are used to determine how superpredation affects the behaviour and life history strategies of individuals and investigate its effects at the population and community level.

P1.14

Poster Session - Tuesday 18th December 2012

Central-place foraging flights of a large gull under varying meteorological conditions

Tom J Evans (CAnMove Centre Department of Biology Lund University), Edwin Baaij (Institute for Biodiversity and Ecosystem Dynamics University of Amsterdam), Judy Shamoun-Baranes (Institute for Biodiversity and Ecosystem Dynamics University of Amsterdam), Jonas Hentati Sundberg (Stockholm Resilience Centre Stockholm University), Willem Bouten (Institute for Biodiversity and Ecosystem Dynamics University of Amsterdam), Anders Hedenström (CAnMove Centre Department of Biology Lund University), Susanne Åkesson (CAnMove Centre Department of Biology Lund University)

Seabirds typically breed at high density, foraging over a wide surrounding area. We study a species with a mixed strategy of pelagic marine and land based foraging. Using high

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resolution GPS tracking we followed 16 gulls throughout the breeding period. Foraging flights are analysed with respect to varying conditions (e.g. wind), measuring the consequence and counter-strategies of the gulls.

P1.15

Poster Session - Tuesday 18th December 2012

Psidium (Myrtaceae) flowering in cerrado savannah Brazil

Vanessa G Staggemeier (Universidade Federal de Goiás), Carolyn E B Proença (Universidade Nacional de Brasília), José Alexandre F Diniz-Filho (Universidade Federal de Goiás)

Evaluating the large-scale plant phenology is crucial to understand how the climate affects the ecosystem functioning. We seek depicting which abiotic factors influence flowering of *Psidium* along the Brazilian cerrado. Although flowering was seasonal and related to day-length in South of cerrado, where hydric restriction is less pronounced, flowering in the North was affected by the transition between dry/rainy seasons

P1.16

Poster Session - Tuesday 18th December 2012

Australasian gannets stay close to home during their winter exodus

Jonathan A Green (University of Liverpool), Norman Ratcliffe (British Antarctic Survey), John P Y Arnould (Deakin University), Ashley Bunce (University of Queensland)

Relatively little is known about what seabirds do during winter, despite this being a critical phase in their life history. We determined the overwinter location and time-budget of Australasian gannets. In stark contrast to our expectations we found that they spent most of the winter close to the breeding colony and showed remarkable inter-individual diversity in behavioural strategies.

P1.17

Poster Session - Tuesday 18th December 2012

Factors influencing foraging of large hoverflies

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Anezka Pavlikova (University of South Bohemia Faculty of Sciences Institute of Entomology Biology Centre AS CR), Zdenek Janovsky (Dept. of Botany Faculty of Science Charles University in Prague Benátská 1022 128 43 Praha 2), Dagmar Rihova (Dept. of Zoology Faculty of Science Charles University in Prague Vinicna 7 128 43 Praha 2), Michael Mikat (Dept. of Zoology Faculty of Science Charles University in Prague Vinicna 7 128 43 Praha 2), Stanislav Vosolsobe (Dept. of Experimental Plant Biology Fac. of Sci. Charles University in Prague), Jan Ponert (Dept. of Experimental Plant Biology Fac. of Sci. Charles University in Prague Prague Bot. Garden)

We studied, how plant traits and weather conditions influence pollination activity of several large hoverfly species (Diptera, Syrphidae, Eristalini) in the meadow. We present here a five-year study focusing on among-species ecological differences in foraging behaviour with respect to traits of plant individuals and actual weather conditions. This research was funded by GACR P505/11/1589.

P1.18

Poster Session - Tuesday 18th December 2012

Factors influencing abundances of hoverfly pollinators in agricultural landscape: Do linear verges provide quality catering?

Eva Horcickova (Dept. of Botany Faculty of Science Charles University), Zdenek Janovský (Dept. of Botany Faculty of Science Charles University), Anezka Pavlikova (Fac. of Science University of South Bohemia Institute of Entomology Biology Centre), Michael Mikat (Dept. of Zoology Faculty of Science Charles University), Jiri Hadrava (Dept. of Zoology Faculty of Science Charles University), Katerina Kmecova (Secondary grammar school Znojmo Czech Republic), Doubravka Pozarova (Secondary grammar school Rakovník Czech Republic), Jan Smycka (Dept. of Botany Faculty of Science Charles University), Tomas Herben (Dept. of Botany Faculty of Science Charles University)

We examined hoverfly and flowering plant abundances at meadow and verge sites in an agricultural landscape of Czech Republic. We recorded two spatial scales for flowering plants (plot and 15 m-radius surroundings) and the whole system was studied in three study periods during summer. Hoverflies don't distinguish meadow and verge sites and generally only follow their preferred plants.

P1.19

Poster Session - Tuesday 18th December 2012

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The cleaning behaviour of lumpfish (*Cyclopterus lumpus*): are they predators of salmon lice?

Asa Johannesen (University of Leeds), Alison Dunn (University of Leeds), Lesley J Morrell (University of Hull)

In aquaculture, salmon and sea lice present a great welfare and financial problem. A solution to this problem is to use cleaner wrasse, but these are limited geographically. We investigated the foraging behaviour of lumpfish, and found that while not a prodigious cleaner, there were instances where they removed lice from salmon.

P1.20

Poster Session - Tuesday 18th December 2012

Total lipid and fatty acid composition of the hadal amphipod *Hirondellea dubia* (Lyssianasidae) from the Kermadec Trench, SW Pacific.

Nichola C Lacey (University of Aberdeen), Alan J Jamieson (University of Aberdeen), David Pond (Scottish Association of Marine Science), Daniel Mayor (University of Aberdeen)

Very little is known about the communities inhabiting the deepest marine biozone on Earth, the hadal zone (6-11 km depth). Amphipods are a ubiquitous component of the hadal fauna. Lipid and fatty acid composition of *Hirondellea dubia*, are investigated to provide insight into their nutritional ecology, lipid physiology, reproduction and development.

P1.21

Poster Session - Tuesday 18th December 2012

Two-sex population modelling of African lions: challenges, results, and future applications

Julia A Barthold (Imperial College London Max Planck Institute for Demographic Research Germany), Craig Packer (University of Minnesota US), Tim N Coulson (Imperial College London)

Single-sex integral projection models (IPMs) of animal populations have been used in ecology, evolution, and conservation. Constructing two-sex IPMs however remains a challenge due to intersexual dependence of population dynamics, complex social systems, and high data demands. We present a two-sex IPM of African lions, which we used to

study sex differences in life histories and inform future data collection.

P1.22

Poster Session - Tuesday 18th December 2012

Episodic acidification affects the breakdown and invertebrate colonisation of oak litter

Marian C Pye (Cardiff University), Ian P Vaughan (Cardiff University), Steve J Ormerod (Cardiff University)

Although European streams are now recovering chemically from acidification, associated biological recovery is limited. This study indicates that acid episodes could suppress recovery not only through direct toxicity to invertebrates, but also through indirect effects on litter breakdown. These results could have important implications for food web dynamics in episodically acidified streams.

P1.23

Poster Session - Tuesday 18th December 2012

Investigating fish assemblages across a depth gradient along three reef lines in Western Australia

Lydia Bach (University of Glasgow), Euan Harvey (University of Western Australia)

Relative number of individuals, species richness increased along from inshore to offshore. There were distinct fish assemblages associated with each reef line, related to depth and the physical structure. This study demonstrates that only broad depth ranges can include a representative sample of the whole fish assemblage of an area & emphasises the importance of stratifying sampling designs.

P1.24

Poster Session - Tuesday 18th December 2012

The impact of artificial floods from an upland British reservoir on downstream conditions.

Ben R Gillespie (University of Leeds), Paul Kay (University of Leeds), Lee E Brown

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(University of Leeds)

The impacts of artificial floods from upland British reservoirs are poorly understood. This PhD project aims to assess the relationships between flow parameters (e.g. magnitude and duration) and downstream conditions. Specifically, impacts to biota (macroinvertebrates and benthic biomass), water quality (temperature, oxygen, conductivity, pH, metals and nutrients) and morphology (suspended and bedload sediment movement) will be assessed.

P1.25

Poster Session - Tuesday 18th December 2012

Predation on artificial caterpillar models along a disturbance and altitudinal gradient in Papua New Guinea

Katerina Tvardikova (Institute of Entomology Biology Centre CR Faculty of Science University of South Bohemia CR), Vojtech Novotny (Institute of Entomology Biology Centre AS CR Faculty of Science University of South Bohemia CR)

Relative levels of predation on exposed and concealed caterpillar models, and on models exposed on damaged and undamaged leaves were compared across a gradient of disturbance and altitude. Caterpillars from damaged leaves were attacked more than caterpillars from undamaged leaves, and concealed ones were the least attacked. Importance of individual predators (birds, ants, wasps) and parasitoids differed along gradients.

POSTER: BIOGEOGRAPHY ECOSYSTEM ECOLOGY AND ECOSYSTEM SERVICES

P2.1

Poster Session - Tuesday 18th December 2012

DExtER (Disturbance Extremes and Ecological Responses): Three Year Experiment Investigating the Impacts of Extreme Weather Events on Diversity, Stability and Ecosystem Function of British Grasslands.

Kathryn M Lockett (Imperial College London)

DExtER: a three year experiment, based at Silwood Park, Imperial College, investigating

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floral composition, net productivity, aboveground arthropod diversity and belowground microarthropod diversity across plot, site and landscape scales and how these are affected by extreme rainfall events. Using natural, established grassland communities to shed light on whether initial floral diversity influences community stability and function under extreme stresses

P2.2

Poster Session - Tuesday 18th December 2012

Mapping ecosystem service and biodiversity changes over 70 years in a rural English county

Mingkai Jiang (Lehigh University), James Bullock (Centre for Ecology and Hydrology), Danny Hooftman (Centre for Ecology and Hydrology)

Few studies have been able to map long-term changes in the quantity and patterns of ecosystem service delivery, especially in relation to human activities. Here, we use a novel method to link habitat type identified in maps of the 1930s and the year 2000 with land-use to map changes in ecosystem services and biodiversity over the 70-year period.

P2.3

Poster Session - Tuesday 18th December 2012

Forest biodiversity and its influence on above-ground productivity across Europe.

Tommaso Jucker (University of Cambridge), Olivier Bouriaud (University of Suceava), David A Coomes (University of Cambridge)

The field of Biodiversity and Ecosystem Functioning (B-EF) has been steadily gaining momentum. Nonetheless, relatively little is known about B-EF in natural and large scale ecosystems such as forests. Using data on tree growth collected within the context of the FunDivEUROPE project, we explore the relationship between above-ground productivity and stand diversity in forest across Europe.

P2.4

Poster Session - Tuesday 18th December 2012

Wood decomposition at the forest edge

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Martha E Crockatt (Earthwatch), Daniel P Bebbler (Earthwatch)

Fungi are vital to global carbon cycling through their ability to decompose wood. As forests worldwide become increasingly fragmented impacts of altered forest edge microclimate on wood decomposition must be understood, as temperature and moisture are key regulators of fungal processes. Results from a two year field study into edge influence on wood decomposition rate and microclimate are presented.

P2.5

Poster Session - Tuesday 18th December 2012

Comparative phylogeographical study of *H. sieboldiana* and *H. albomarginata* (Liliaceae) of Japan

Sangryong Lee (Tohoku University)

Hosta sieboldiana and *H. albomarginata* are widespread herbaceous species in Japan. We performed the phylogeographical study of *H. sieboldiana* and *H. albomarginata*. The genetic variation and differentiation in *H. sieboldiana* and *H. albomarginata* were investigated based on the sequence variations in two chloroplast DNA regions, *trnS*(GCU)-*trnG*(UCC) and *trnL*(UAG)-*rpl32*-F intergenetic spacers.

P2.6

Poster Session - Tuesday 18th December 2012

The Ecology of Natural and Artificial Peat Bog Pools in the English Pennines

Jeannie M Beadle (University of Leeds), Lee E Brown (University of Leeds), Joseph Holden (University of Leeds)

Recent drain-blocking initiatives across British peatlands have created thousands of artificial peat pools, yet little is known about their ecology. My PhD research aims to investigate the biodiversity (taxonomic and functional), functioning and response to climate change of these small, lentic waterbodies and to make comparisons with natural peat pools.

P2.7

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Poster Session - Tuesday 18th December 2012

Exploring how landscape complexity influences aphid biocontrol.

Victoria J Wickens (University of Reading), Michael MPD Garratt (University of Reading),
Simon G Potts (University of Reading)

Effective use of natural enemies can partially replace or supplement chemical control methods of pests. We investigate how aphids and their natural predators respond to two landscape gradients: proportion of calcareous grassland and proportion of winter wheat. This study aims to support the development of more sustainable pest regulation practices.

P2.8

Poster Session - Tuesday 18th December 2012

A global analysis of migratory bird species richness

Naiara K O'Mahony (Durham University)

Migrant birds are likely to be particularly susceptible to climate change impacts at various stages of their migration pathways, and hence may be more threatened than resident species. Here I explore environmental drivers of global migrant bird richness and project future migratory bird distributions given future climate and land-use changes.

P2.9

Poster Session - Tuesday 18th December 2012

Responses of AMF communities to grassland management practices are host specific

Majka Smilauerova (Faculty of Science University of South Bohemia Czech Republic), Jiri Kosnar (Faculty of Science University of South Bohemia Czech Republic), Jan Leps (Faculty of Science University of South Bohemia Czech Republic)

Management (fertilization, mowing) of grasslands changes not only the plant community, but also the communities at other trophic levels, such as arbuscular mycorrhizal fungi (AMF). We found that the changes in diversity and composition of AMF communities in the roots (identified by the next generation sequencing technique) are host-species specific.

P2.10

Poster Session - Tuesday 18th December 2012

The value of urban allotments for pollinators: floral resource quantity and quality

Eileen F Power (Newcastle University), Charlotte A Urwin (Newcastle University),
Geraldine A Wright (Newcastle University)

Urban allotments can be refuges for pollinators and are often dependent on pollination to increase yields. We surveyed plants and pollinators and analysed nectar/pollen nutritional value in five allotments. Pollinators were not related to floral abundance as variation was observed in quantity and quality of floral resources. We discuss results in the context of improving floral resources for urban pollinators.

P2.11

Poster Session - Tuesday 18th December 2012

Plant species occurrence along primary successions: is there any stoichiometric link?

Francesca Di Palo (University of Ulster), Dario Fornara (University of Ulster)

Plant species distribution along primary successions can be influenced by the availability of key soil resources such as nitrogen (N) and phosphorus (P). We ask whether an ecological stoichiometry approach could explain the distribution of herbaceous plant species along four primary successions (two glacier and two sand dune chronosequences). Functional groups seem to 'set' the stoichiometry ratios of these species.

P2.12

Poster Session - Tuesday 18th December 2012

A new approach to quantifying recent rates of carbon sequestration in peatland

Lisa R Belyea (Queen Mary University of London), Chris Laing (Queen Mary University of London), Chris Laing (Queen Mary University of London)

Most estimates of recent carbon sequestration in peatland are biased because they do not account for the depth-dependence of decomposition losses. We estimate both inputs and losses of carbon for each depth interval in a dated core, using a conservative tracer to

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constrain proportional mass remaining. The approach is illustrated using data from across a bog plateau-swamp forest gradient.

P2.13

Poster Session - Tuesday 18th December 2012

The influence of plant diversity on soil physical properties in grasslands

Iain J Gould (Lancaster University), John N Quinton (Lancaster University), Gerlinde B De Deyn (Wageningen University), Alexandra Weigelt (Universität Leipzig), Richard D Bardgett (Lancaster University)

Plant diversity has been consistently found to influence nutrient cycling and primary productivity, but little is known of its impact on soil physical properties. We present results from a series of mesocosm and field experiments which aim to determine the impact of plant community composition and diversity on soil aggregate stability.

P2.14

Poster Session - Tuesday 18th December 2012

Greenhouse gas (GHG) emissions from a nutrient-poor and nutrient-rich floodplain fen in the Norfolk Broads, UK.

Kieran M Stanley (Queen Mary University of London), Catherine M Heppell (Queen Mary University of London), Lisa R Belyea (Queen Mary University of London), Andy J Baird (University of Leeds)

Comparatively few studies have considered GHG exchanges in lowland peatlands, including floodplain fens. We quantified monthly CO₂, CH₄ and N₂O exchanges from two floodplain fens in the Norfolk Broads for three months using a static closed flux chamber. Current results show greater CH₄ exchange at the nutrient-poor site than the nutrient-rich site.

P2.15

Poster Session - Tuesday 18th December 2012

Environment, biodiversity, and ecosystem functioning interactions in a neotropical savanna

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Gustavo H Carvalho (Universidade Federal de São Carlos), Marco A Batalha (Universidade Federal de São Carlos), Igor A Silva (Universidade Estadual de Campinas), Marcus V Cianciaruso (Universidade Federal de Goiás), Owen L Petchey (University of Zurich)

We used structural equation modelling to test existing hypotheses about the pairwise effects among environment, biodiversity, and ecosystem functioning in a neotropical savanna. By expressing these hypotheses simultaneously, we revealed the direct and indirect effects of fire, soil nutrients, aluminium, and water availability on functional diversity of woody plants and litter decomposition rates.

P2.16

Poster Session - Tuesday 18th December 2012

The BiodivERsA database: a webportal to identify resources and network opportunities for biodiversity research

Hilde Eggermont (Belgian Science Policy Office - Belgian Biodiversity Platform), Estelle Balian (Belgian Science Policy Office - Belgian Biodiversity Platform), Xavier Le Roux (FRB Paris France), André Heughebaert (Université Libre de Bruxelles - Belgian Biodiversity Platform), BiodivERsA Partners (www.biodiversa.org)

Here, we present the BiodivERsA (www.biodiversa.org) Research Information System holding information about past and current funding programs on biodiversity in Europe (including thematic and blue sky programs, grants, fellowships), research organisations, (6000+) projects, and experts in biodiversity research. As such, this database aims to help European scientists to identify potential resources and network opportunities to further develop their research.

P2.17

Poster Session - Tuesday 18th December 2012

Examining Terminology and Units in Ecological and Environmental Health

Samantha L Cruickshank (Aston University), Graham Leask (Aston University), Phil Fermor (Middlemarch Environmental Ltd.)

Ecological and environmental health is becoming more ingrained in economic development and land use decisions. However, can we adequately value the impacts of development on ecology without accepted definitions and units for its measurement?

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This research considers common measures of indicating environmental health to encourage consensus of thought on valuation methods and inclusion in economic development.

P2.18

Poster Session - Tuesday 18th December 2012

Ramet turnover under differing water levels in *Vinca minor*

Tomas Koubek (Botany department Faculty of Science Charles university in Prague),
Martin Weiser (Botany department Faculty of Science Charles university in Prague)

We studied how plants of *Vinca minor* drop their unrooted ramets when under water stress. We subjected them to 4 water levels and traced fates of various kinds of ramets. The plants with full irrigation have grown the most new stolons and also dropped the stolons with dry ends. The dry treatments did not grow and held their unpromising ramets.

P2.19

Poster Session - Tuesday 18th December 2012

Does size matter? Effects of herbivore removal on soil properties

Alan G Haynes (WSL), Martin Schütz (WSL), Anita C Risch (WSL)

Although diverse herbivore communities utilise grasslands, many previous studies only excluded the largest animals. Thus, little is known about how smaller herbivores, including invertebrates, affect grassland processes. We find that sequentially excluding different sized herbivores strongly impacts soil properties such as moisture, temperature and respiration. Such changes have potential implications for ecosystem nutrient cycling (e.g. C storage).

P2.20

Poster Session - Tuesday 18th December 2012

The Impact of Native and Exotic Plants on Soil Biodiversity and Ecosystem Function

Stephanie Bird (University of Roehampton), Andrew Salisbury (RHS), Peter Shaw (University of Roehampton), Claire Ozanne (University of Roehampton)

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The aim of this study is to determine the effects of anthropogenic management; whether planting gardens with flora native to the UK, with near native species or southern hemisphere exotics, on soil fauna composition and/or functioning. Soil fauna will be extracted to look for differences in number, diversity and community structure between treatments and sites, with decomposition rates also assessed.

P2.21

Poster Session - Tuesday 18th December 2012

Why are Darwin's 'beloved Drosera' red?

George W Foot (Loughborough University), Jonathan Millett (Loughborough University)

Leaves of the carnivorous *Drosera rotundifolia* (sundew) exhibit variation in leaf pigment composition. Data obtained from UK ombrotrophic bogs with a wide range of N deposition, along with the manipulation of the light environment, is used to address the significance of light radiation and N availability in driving differences in *D. rotundifolia* leaf pigmentation.

P2.22

Poster Session - Tuesday 18th December 2012

The structure, stability and functioning of macro-invertebrate communities in rainforest transformation systems in Sumatra (Indonesia)

Malte Jochum (Georg-August-Universität Göttingen), Andrew D Barnes (Georg-August-Universität Göttingen), Ulrich Brose (Georg-August-Universität Göttingen)

The consequences of land-use change on Sumatra, Indonesia are being investigated by 27 workgroups from Goettingen University. Environmental processes, biota and ecosystem services and human dimensions are surveyed. In tropical lowland forest, jungle rubber, rubber, and oil palm we will examine structure, stability and functioning of soil-litter macro-invertebrate communities. We will also model population stability, food-web persistence and decomposition rates.

POSTER: BIODIVERSITY CONSERVATION AND MANAGEMENT

P3.1

Abstracts for BES 2012 Annual Meeting From 18-12-2012 To 20-12-2012

Poster Session - Tuesday 18th December 2012

Do riparian reserves in oil palm plantations conserve terrestrial insect species and their ecological functions?

Claudia L Gray (Oxford University), Darren Mann (Hope Entomological Collections Oxford University Natural History Museum), Owen Lewis (Oxford University)

Forest buffers along rivers are legally required in Malaysian oil palm plantations, to improve water quality. However, their role in the conservation of tropical forest species remains poorly understood. Using dung beetles as a focal taxa, we found that riparian reserves maintain community composition and species richness similar to continuous forest, but beetle abundance and dung removal function is impaired.

P3.2

Poster Session - Tuesday 18th December 2012

Managing the Retreat: Short-term salt marsh development in coastal realignment projects

Anissia C White (Plymouth University), Michael E Hanley (Plymouth University), Gerd Masselink (Plymouth University), William H Blake (Plymouth University), Simon PG Hoggart (Plymouth University)

Salt marsh vegetation development following managed realignment remains uncertain. In this study, we investigated the transition of reclaimed land into salt marsh on a site of regulated tidal exchange in Devon, UK. Slow ecological and geomorphological development was evident after the first year, indicating a need to adjust the tidal gate to increase the frequency and extent of marsh inundation.

P3.3

Poster Session - Tuesday 18th December 2012

Impact of Contrasting Management on Upland Limestone Vegetation

Ashley Lyons (Edge Hill University), Ian Powell (Edge Hill University), Anne Oxbrough (Edge Hill University), Paul A Ashton (Edge Hill University)

Sheep and cattle grazing are often used for conservation management in upland limestone areas. However, there is little research on the effects of these different grazing regimes on

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biodiversity. This paper addresses this gap, investigating the impact on vegetation composition and diversity of three grazing regimes at Great Asby Scar NNR.

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P3.4

Poster Session - Tuesday 18th December 2012

Are UK anglers and kayakers acting as vectors for alien invasive species in UK freshwaters?

Lucy G Anderson (University of Leeds), Alison M Dunn (University of Leeds), Piran CL White (University of York)

Alien invasive species (AIS) cost the UK economy ~£2bn pa. Nine out of ten the Environment Agency's 'Most Wanted' AIS are aquatic or riparian species, many of which can survive in damp environments for a number of days and may potentially be moved on fishing/boating equipment. We surveyed UK anglers and boaters to assess the biosecurity risk that they pose.

P3.5

Poster Session - Tuesday 18th December 2012

Habitat fragmentation and population regeneration of *Ziziphus lotus* (Rhamnaceae) in semiarid woody plant communities of southeastern Spain

Inmaculada Cancio (Universidad de Jaén), Julio M. Alcántara (Universidad de Jaén), Alfonso M. Sánchez-Lafuente (Universidad de Jaén), Marcelo C Cavalcante (Universidade Federal do Ceará), Pedro J Rey (Universidad de Jaén)

Ziziphus lotus is part of semiarid woody plant communities of Spain which are habitats of community interest within the European Union. This taxon faces severe habitat fragmentation. We evaluated fragmentation descriptors through GIS and spatial analysis and linked them with population regeneration estimators (fruit set and ratio juveniles/adults) in 19 populations spanning the species distribution in Spain.

P3.6

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Poster Session - Tuesday 18th December 2012

The conservation status of *Maytenus senegalensis* subsp. *europaeus* (Celastraceae) in the severely fragmented woody plant communities of southeastern Spain

Inmaculada Cancio (Universidad de Jaén), Julio M Alcántara (Universidad de Jaén), Alfonso M Sánchez-Lafuente (Universidad de Jaén), Marcelo C Cavalcante (Universidade Federal do Ceará), Pedro J Rey (Universidad de Jaén)

M. senegalensis is classified as “threatened” in Spain, with greenhouse agriculture and urban development as major triggers of the species’ habitat loss. We evaluated the conservation status of this species from surveys of population regeneration and habitat fragmentation assessments in 21 populations from southeastern Spain.

P3.7

Poster Session - Tuesday 18th December 2012

Potential Impact of the New Zealand flatworm on below and above ground biodiversity

Brian Boag (The James Hutton Institute), Roy Neilson (The James Hutton Institute)

The New Zealand flatworm is a predator of native earthworms in the British Isles. The decline in earthworm populations, especially anecic species, has been documented in western Scotland and Northern Ireland. In western Scotland the presence of the flatworm has also been associated with the eradication of moles. The impact on other soil invertebrates, birds and mammals awaits investigation.

P3.8

Poster Session - Tuesday 18th December 2012

Changes in soil chemistry over time in chemically restored lowland heath and unrestored grassland

Iain D. Green (Bournemouth University), Anita Diaz (Bournemouth University), Mark Tibbett (Cranfield University)

Lowland heath vegetation can be successfully restored on former pasture via the use of sulphur to modify the chemistry of the soil. To maintain this community in the long term, competitive grasses must be suppressed. Essential to this will be maintenance of the

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correct soil chemistry. We show that sulphur application maintains favourable soil conditions over 10 years after application.

P3.9

Poster Session - Tuesday 18th December 2012

Greening walls in urban areas leads to improved animal biodiversity and human wellbeing.

Caroline Chiquet (IESR - Science Centre - Staffordshire University), John W Dover (IESR - Science Centre - Staffordshire University), Paul Mitchell (Science Centre - Staffordshire University)

The vertical dimension is an underexploited aspect of the urban environment. 'Green walls' can enhance biodiversity, improve human wellbeing and reduce stress. They are easily retrofitted to buildings where intensive green landscaping may not be achievable and some designs can result in instant greening. Free-standing designs can be used to structure open spaces and provide intimacy.

P3.10

Poster Session - Tuesday 18th December 2012

Responses of biodiversity to land-use change: Is the biota of Asia more sensitive than other continents?

Helen R Phillips (Imperial College London), Igor Lysenko (Imperial College London), Tim Newbold (UNEP-WCMC), Sean Tuck (Imperial College London), Andy J Purvis (Imperial College London)

I compared species' abundances between three habitat classes (primary, secondary and plantation forests) in three continents — Asia, Africa and South America — using data from 2343 species, 355 sites and 28 published studies. A proxy of habitat quality, enhanced vegetation index (EVI), was also used to model how abundance changed with habitat quality.

P3.11

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Poster Session - Tuesday 18th December 2012

A Quarter Century of Change in Upland Grassland Community Composition

Elizabeth Sullivan (Edge Hill University), Ian Powell (Edge Hill University), Paul Ashton (Edge Hill University)

Upland hay meadows are a threatened European habitat subject to changing climate and management. Surveys of such habitats in the Forest of Bowland were undertaken using the same methodology and sites as the NCC grassland surveys of the 1980s. Changes in community composition were analysed and the links to meadow management regimes, approaches to conservation and climate are discussed.

P3.12

Poster Session - Tuesday 18th December 2012

Deer and biodiversity

Georgina Palmer (Durham University), Stephen G Willis (Durham University), Philip A Stephens (Durham University), Alastair I Ward (FERA)

Deer abundance and ranges are increasing in Britain, and there is growing concern regarding the impacts this may have on other components of biodiversity. Here, I assess the impact of roe deer on the biodiversity of British woodlands using a combination of field data, and long-running Breeding Bird Survey data.

P3.13

Poster Session - Tuesday 18th December 2012

Identifying the key foraging areas of seabirds breeding in the Caribbean: initial tracking data indicates sampling effort required to characterise key areas

Louise M Soanes (University of Liverpool), Jenny Bright (RSPB), Mark Bolton (RSPB), James Millett (RSPB), Jonathan A Green (University of Liverpool)

Due to the nature of seabird tracking small samples are often used to predict the foraging areas of the entire colony. With a sample of 16 Brown Boobies we were able to identify only 19% of the core foraging area of the colony This highlights the need to consider how representative samples are before applying them to MPA designation

P3.14

Poster Session - Tuesday 18th December 2012

Long-term effects of ozone on flowering intensity and timing in a semi-natural upland grassland community

Sylvia Toet (University of York), Joanna Witton (University of York), Naomi Rintoul (University of York), Simon Peacock (University of Newcastle), Neil Cape (Centre for Ecology Hydrology Edinburgh), Jeremy Barnes (University of Newcastle), Mike Ashmore (University of York)

The ecological implications of rising background tropospheric ozone concentrations are uncertain. We report results from a free-air release experiment in a UK upland grassland showing that small increases in ozone exposure over four years reduced the flower numbers of major forb and grass species, but not the timing of flowering.

P3.15

Poster Session - Tuesday 18th December 2012

Using newly planted woodlands to better understand the belowground processes keeping our woods healthy and productive

Kirsty K Monk (Plant Sciences Department Oxford), David Bass (Natural History Museum London), Nick D Brown (Linacre College Oxford), Gabriel E Hemery (Silva Foundation)

Rapid fungal surveys were completed in woodlands of different ages in the Heart of England Forest to investigate temporal changes in fungal communities following tree planting on old agricultural land. This will inform future forest policy and practice, to manage woodlands for their ecosystems as well as their biomass, enabling them to withstand and mitigate the pressures of environmental change.

P3.16

Poster Session - Tuesday 18th December 2012

Changes in woody vegetation in Nigerian savannah from 1985 to present.

Salamatu J Fada (Bangor University), James M Gibbons (Bangor University), Andrew S Pullin (Bangor University)

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Savannahs are threatened by direct (resource extraction) and indirect (climate warming) anthropogenic activities. Interactions between these threats are complex and poorly understood. Remeasurement of vegetation transects established in 1985 at Yankari Game Reserve suggests reductions in abundance of woody species with especially large reductions in species used for cattle fodder.

P3.17

Poster Session - Tuesday 18th December 2012

Evaluation of a rapid monitoring technique for grassland plant communities.

Andrew Hall (Bournemouth University), Anna Callam anderson (Bournemouth University), Jade Furnston (Bournemouth University), Nicola Lamb (Bournemouth University), Kirsten Cardrick (Bournemouth University), Rosie Nicoll (Bournemouth University), Katriona Macintyre (Bournemouth University), Anita Diaz (Bournemouth University)

Monitoring the ecological consequences of habitat management, restoration or creation is crucial for understanding which methods work. Despite this, monitoring is often neglected due to its cost. Here we present a simple, rapid monitoring method for measuring species richness and identifying change in dominant species. We compare its results with those obtained from a typical comprehensive vascular plant community survey.

P3.18

Poster Session - Tuesday 18th December 2012

Habitat management for wildlife and human wellbeing: conflicts or synergies?

Anna Callam anderson (Bournemouth University), Andrew Hall (Bournemouth University), Susanna Curtin (Bournemouth University), Anita Diaz (Bournemouth University)

Human health and wellbeing is an important ecosystem service. We asked people how access to the countryside made them feel and what landscape features and facilities most added to their enjoyment. The vast majority of respondents reported that visiting the countryside made them feel healthier and less stressed. The most favoured landscape features were ponds/lakes, broadleaved woodland and flowery meadows.

P3.19

Poster Session - Tuesday 18th December 2012

A glimpse into the future

Christopher Illori (University of Greenwich)

The fact that the World is currently experiencing biodiversity loss as a result of land-use and climate change is no longer a debate. This study therefore aims to produce habitat suitability maps for current and future distributions of the endemic bird species in the Upper Guinea forest of West Africa using a predictive species distribution model..

P3.20

Poster Session - Tuesday 18th December 2012

**EFFECT OF ANTHROPOGENIC PRESSURES ON THE BIODIVERSITY
CONSERVATION in CORE AREA OF MANAS BIOSPHERE RESERVE**

Sandipan Das (IGNOU)

The present study focuses on the anthropogenic threats of core zone of Manas Biosphere Reserve (MBR). There are 78 fringe villages, 8,156 household and 44,669 populations, with a major local settlement of 92 households and 506 populations inside MBR and an encroachment of 22.00 km². The major threats are Human influx, Extraction of forest products, Hunting and poaching.

P3.21

Poster Session - Tuesday 18th December 2012

Ontogenetic Niche-shifts within UK Floodplain Meadows

Fiona H Cameron (The Open University)

Ontogenetic niche shifts are changes in resource or habitat use that occur during the course of an individual's life-time. I investigate evidence for niche shifts among English floodplain meadow plants and ask: 1. how can these changes be characterised, and, 2. what suite of environmental conditions are required for the long-term survival of rare meadow-plant populations such as the Fritillary?

P3.22

Poster Session - Tuesday 18th December 2012

Inspiring public interest in wild plants

Bethan C Stagg (Plymouth University), Dr Maria Donkin (Plymouth University)

We used botanical craft events to inspire people about plants, testing novices' botanical survey and identification performance. Teaching methods based on an interactive card game, mnemonic (memory) aids and dichotomous key significantly increased identification performance, with gender and education also contributing. Novices were trained to accurately conduct a grassland ecological assessment based on indicator species, sward structure and composition.

P3.23

Poster Session - Tuesday 18th December 2012

Ecological impacts of biodiversity enrichment in oil-palm plantations

Miriam Teuscher (Georg-August-University Goettingen), Ulrich Brose
(Georg-August-University Goettingen)

The transformation of rainforest into oil-palm plantations has led to dramatic losses in biodiversity. Ecological enrichment plantings of six native tree species will be established in gaps of an oil-palm plantations on Sumatra following a random partition design. Fauna surveys will address effects on taxonomic and functional diversity of birds and arthropods.

P3.24

Poster Session - Tuesday 18th December 2012

The impact of peatland restoration on specialised insect assemblages

Lisa Becker (The James Hutton Institute), Nick Littlewood (The James Hutton Institute)

Deforestation of timber plantations is common practice to restore peatlands and bogs to their natural state. Subsequent evaluation is normally carried out through monitoring hydrology and carbon sequestration processes. However, this study investigates the impact on insect biodiversity and community dynamics. Insect assemblages in peatlands

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are known to be highly specialised and especially vulnerable to disturbance events.

P3.25

Poster Session - Tuesday 18th December 2012

Assessment of the success of calcareous grassland creation on the basis of plant species composition and individual species occurrence

Markus Wagner (CEH Wallingford), Kate Fagan (Natural England), Rob Marrs (University of Liverpool), Richard Pywell (CEH Wallingford)

Using a dataset of 40 sites where calcareous grassland was created on ex-arable land, and a similar number of ancient calcareous grassland reference sites, grassland creation success was evaluated based on compositional similarity. In addition, indicator species analysis was used to identify species characteristic of specific stages of natural regeneration at sites that remained unsown.

P3.26

Poster Session - Tuesday 18th December 2012

SCaMP - Catchment Scale Restoration

Penny Anderson (Penny Anderson Associates)

United Utilities' Sustainable Catchment Programme (SCaMP) is an innovative, large scale project with the objectives of improving sample catchments for drinking water quality, nature conservation and sustainable agriculture. The outcomes have been monitored by Penny Anderson Associates since 2005 with key results presented in terms of vegetation, water quality, water table and carbon changes.

P3.27

Poster Session - Tuesday 18th December 2012

BiodiversityOffsetting:Introducing the need forScientific Rigor.

Leslie J Cousins (University of Essex)

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This poster introduces an on-going PhD project that seeks to test the new Defra metric for biodiversity offsetting. Using scientifically recognised methods of diversity measurement, results are displayed summarising preliminary analysis of data gathered from ancient woodlands. The discussion demonstrates how a rigorous approach should be considered for its sensitivity to measured diversity beyond simple habitat recognition.

P3.28

Poster Session - Tuesday 18th December 2012

The conservation of arable weeds at crop edges in Mediterranean barley fields.

Laura Armengot (Universitat de Barcelona), Laura José-María (Universitat de Barcelona), José M. Blanco-Moreno (Universitat de Barcelona), Lourdes Chamorro (Universitat de Barcelona), F. Xavier Sans (Universitat de Barcelona)

Crop-edges have a potential to conserve biodiversity, as they are less impacted by farming practices than the interiors of fields. We evaluate the effects of weed control and fertilisation on weeds and yield in conventional and organic crop-edges. Limiting the use of herbicides was crucial to enhancing weeds whereas fertilisation and weed harrowing had little effect on weeds.

P3.29

Poster Session - Tuesday 18th December 2012

Ecology and conservation of RET plants of Manas National Park, Assam, India.

Sandipan Das (IGNOU)

Survey was conducted in Manas National Park (MNP) during 2007 to 2012, wherever Rare, Endangered and Threatened (RET) plant species were said to exist, based on primary field visit and secondary information in literature. 46 plant species are categorized as "Rare", eleven plant species categorized as 'Endangered' and one "Critically endangered".

P3.30

Poster Session - Tuesday 18th December 2012

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Management Impacts on Biodiversity in the New Forest, Hampshire

Alexander T Lovegrove (Bournemouth University)

Management interventions affect both biodiversity and the successional processes of the New Forest landscape. As part of the growing need for evidence-based management, specific knowledge of these interventions are urgently required. This study will examine changes in biodiversity and ecosystem function following management, using a series of heathland chronosequences. Future work will examine wetland and recreation management.

P3.31

Poster Session - Tuesday 18th December 2012

Nature Locator: Geospatial Smartphone Apps and the use of Crowd Sourcing for the Recording of Invasive Species

Dave J Kilbey (University of Bristol), Julian Partridge (University of Bristol), Michael Pocock (Centre for Ecology and Hydrology), Jasper Tredgold (University of Bristol), Chris Bailey (University of Bristol)

Obtaining accurate data about the distribution of invasive species is of paramount importance when it comes to assessing impact and formulating an appropriate response. But data provision is often patchy and records are usually unverifiable and lacking accurate geographic reference. We have addressed these problems by combining the development of smartphone applications for biological recording with crowd-sourcing data collection.

P3.32

Poster Session - Tuesday 18th December 2012

The value of secondary forests surrounding the Gola Rainforest National Park, Sierra Leone

Beccy Wilebore (University of Cambridge), David A Coomes (University of Cambridge), Jeremy A Lindsell (Royal Society for the Protection of Birds)

The Gola Rainforest National Park in Sierra Leone is a 71 000 ha stretch Upper Guinean Forest, threatened by slash and burn agricultural encroachment. We compared secondary forests aged between 11 and 100 years since farming with an extensive network of plots

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within the National Park to quantify the benefits of a REDD+ scheme for carbon and biodiversity conservation.

P3.33

Poster Session - Tuesday 18th December 2012

Modelling wetland plant communities with an expert knowledge based Bayesian model

Attila N Lazar (University of Reading), Owen Mountford (CEH), James Blake (CEH), Richard A Skeffington (University of Reading), Mike C Acreman (CEH), Andrew J Wade (University of Reading), Merel B Soons (Utrecht University), Piet Verdonschot (Wageningen University), Anna Besse-Lototskaya (Wageningen University)

Wetland ecosystem behaviour is extremely complex due to the wide variability of the environmental and management conditions and due to the rich diversity of potential plant species. An expert knowledge based, semi-quantitative probabilistic model was developed to tackle with data scarcity and to capture the response of wetland ecosystems to changing environmental and management conditions.

P3.34

Poster Session - Tuesday 18th December 2012

Global assessment of endemic plant biodiversity from Sicily

Giuseppe Bonanno (University of Catania)

The most exhaustive current picture is given about endemic plants from Sicily and its surrounding small islands. Results showed that Sicilian endemic rate is second only to Crete among Mediterranean Islands, whereas IUCN status is unknown for over half of the species. However, Sicily's protected surface includes over 60% of endemic distributional areas.

POSTER: THEMATIC TOPIC: STRESS TOLERANCE IN AN ERA OF CLIMATE CHANGE: FROM GENES TO ECOSYSTEMS

P4.1

Abstracts for BES 2012 Annual Meeting From 18-12-2012 To 20-12-2012

Specific leaf area correlates with temperature: new insights from an old story

Sergey Rosbakh (University of Regensburg), Peter Poschlod (University of Regensburg)

Based on the original data set, we analyzed variability of SLA on three different scales (population, species, community) along a temperature gradient. Additionally, the relative impacts of other habitat characteristics on the trait variability were estimated. The results may help to improve the explanatory power of the trait as a predictor of species composition and ecosystem functioning along temperature gradients.

P4.2

Heat Stress Impedes Development and Lowers Fecundity of the Brown Planthopper *Nilaparvata lugens* (Stål)

Jiranan Piyaphongkul (School of Biosciences University of Birmingham), Jeremy Pritchard (School of Biosciences University of Birmingham), Jeff Bale (School of Biosciences University of Birmingham)

When nymphs were exposed at their ULT_{50} mean development time to adult was increased in both males and females. Exposure of nymphs and adults at their ULT_{50} temperatures significantly extended the time required for their progeny to complete egg development for all mating combinations compared with control. Overall, sub-lethal heat stress inhibited development, lowered fecundity and extended egg development time.

P4.3

Of mites and men: Does *Phytoseiulus macropilis* have the cold hardiness to establish in the UK?

Megan R Coombs (University of Birmingham), Jeffrey S Bale (University of Birmingham)

Biocontrol is an increasingly important component of pest control in commercially grown crops, however there is a risk that use of an exotic organism could harm the native ecosystem. In order to assess the suitability of a predatory mite as a candidate augmentative biological control agent of glasshouse red spider mite survival of a typical UK winter should be investigated.

P4.4

Bumblebees: cold tolerance and impacts of diet

Emily Owen (University of Birmingham), Jeffrey S Bale (University of Birmingham), Scott AL Hayward (University of Birmingham)

Bumblebees (*Bombus terrestris audax*) are economically important crop pollinators with extensive commercial usage. Despite this, their thermal biology is largely unknown. Experiments examining cold survivorship and freezing temperatures were used to investigate the cold tolerance of *B. t. audax* and the influence of dietary components on cold hardiness. Pollen increases bumblebees' freezing temperature, making them less cold tolerant.

P4.5

Effect of acclimation on the differences between male and female *Tetranychus urticae* thermal stress

Nicola White (University of Birmingham), Megan R Coombs (University of Birmingham), Scott AL Hayward (University of Birmingham), Jeffery S Bale (University of Birmingham)

A considerable amount of work has gone into determining the cold tolerance of potential biological control agents. The intraspecies difference of thermal tolerance can be vast, with various abilities for adults and juveniles. Differences can also occur between male and female adults which is present in the common British pest the two-spot spider mite, *Tetranychus urticae*.

P4.6

Stress tolerance of polar terrestrial invertebrates

Matthew J Everatt (University of Birmingham), Jeff S Bale (University of Birmingham), Scott A L Hayward (University of Birmingham), Pete Convey (British Antarctic Survey), Roger Worland (British Antarctic Survey)

The polar regions are host to a number of stressors, including low temperature, limited water availability, salinity and UV radiation. These abiotic factors impact negatively on the survival and development of resident terrestrial invertebrates. The extent to which these organisms tolerate and adapt to stress, and how climate change may impact upon them, is explored.

P4.7

How will predicted changes in precipitation impact a modern cultivar of barley compared to an ancestral variety?

Ruth N Wade (The University of York), Dr Alison Karley (The James Hutton Institute), Dr Scott Johnson (The James Hutton Institute University of Western Sydney), Prof. Sue Hartley (The University of York)

The frequency and intensity of drought is predicted to increase under climate change, potentially affecting crop production. The effect of continuous and intermittent reductions in water availability on the growth of a modern cultivar of barley was assessed and compared to the impacts on an ancestral, potentially more resilient variety.

POSTER: THEMATIC TOPIC: ECOLOGICAL EFFECTS OF NITROGEN DEPOSITION ON ARCTIC AND ALPINE ECOSYSTEMS

P5.1

Effect of nutrient deposition on gas emissions of tropical montane forest soils in southern Ecuador

Anke K Mueller (University of Goettingen - Soil Science of Tropical and Subtropical Ecosystems), Edzo Veldkamp (University of Goettingen - Soil Science of Tropical and Subtropical Ecosystems), Marife D Corre (University of Goettingen - Soil Science of Tropical and Subtropical Ecosystems)

To simulate the effect of predicted nutrient deposition we fertilized forest soils with moderate amounts of nitrogen and phosphorus along an elevation gradient in Ecuador and measured greenhouse gas emissions using static vented chambers. Results indicate that soils are co-limited by N and P and visible effects of nutrient depositions are inversely related to elevation.

P5.2

Large-scale creation of ¹⁵N-labelled litter using a stem injection method

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Richard Nair (University of Edinburgh), Mike Perks (Forest Research), Andrew Weatherall (University of Cumbria), Maurizio Mencuccini (University of Edinburgh)

Variation in natural abundance of ^{15}N is limited, necessitating the use of artificial labelling. We injected 98% ^{15}N - NH_4NO_3 solution into 13 12m Sitka Spruce trees and examine the fate of the label six months before felling, showing enrichment throughout the needle biomass, allowing the use of the entire foliar biomass of the trees as ^{15}N -labelled litter.

P5.3

Mycorrhizal fungal diversifications and the evolutionary history in the Japanese orchid *Cephalanthera*

Yuki Sakamoto (Graduate school of Tohoku University), Masayuki Maki (Tohoku University), Jun Yokoyama (Yamagata University)

Link between orchids and fungi is considered to contribute to the diversity in orchid. The orchid genus *Cephalanthera* shows great dependence on fungi; most species have no or few photosynthetic abilities and receive nutrients and water from fungi. We examined this feature by molecular genetic techniques or phylogenetic analyses using Japanese species of *Cephalanthera*.

POSTER: AGRICULTURAL ECOLOGY

P6.1

Agricultural habitat usage by small mammals.

Amanda Wilson (The James Hutton Institute University of St Andrews), Steve Hubbard (University of St Andrews), Graham Begg (The James Hutton Institute), Brian Fenton (The James Hutton Institute)

To achieve sustainable food production, information about how agriculture influences environmental resources is required. Here, the spatial distribution of wood mice and voles was investigated within an agricultural landscape. We compared the use of cropped areas to that of agri-environment prescriptions. We present preliminary efforts to identify recaptured wood mice using DNA obtained from plucked hairs.

P6.2

Landscape and biological control: impact of spatial organization of agricultural practices on natural enemies

Camille Puech (INRA SAD-Paysage 65 rue de Saint Briec 35042 Rennes France), Jacques Baudry (INRA SAD-Paysage), Stéphanie Aviron (INRA SAD-Paysage)

We measured the effects of organic and conventional agricultural practices at local and landscape scales on communities of aphid natural enemies. Insects were sampled in wheat crops located in twenty 1km² landscapes with varying percent cover of organic farming (6-37%). Results show a strong effect of farming systems and of landscape composition on the abundance of natural enemies.

P6.3

Aphid secondary endosymbionts: different aphid host, different story

Hannah Clarke (The James Hutton Institute Dundee The University of Dundee), Alison Karley (The James Hutton Institute Dundee), Danny Cullen (The James Hutton Institute Dundee), Stephen Hubbard (The James Hutton Institute Dundee University of Dundee University of St. Andrews)

The secondary endosymbiont *Hamiltonella defensa*, in association with the APSE bacteriophage, confers resistance in pea aphids to a common parasitoid wasp. In potato aphids, however, the lowest parasitism rates do not correspond to *H. defensa* presence, suggesting another mechanism of parasitoid resistance and a different role for the secondary endosymbiont.

P6.4

Entry Level Stewardship of no real benefit to farmland birds.

Helen L Hicks (Centre for Ecology and Hydrology), Simon J Butler (University of East Anglia), Matt S Heard (Centre for Ecology and Hydrology), Ken Norris (University of Reading)

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Agri-environment schemes (AES) are the main policy mechanism for reversing farmland bird declines across Europe. Using the English Entry Level Stewardship scheme (ELS) as an example, we applied a resource modelling approach to examine whether this scheme is likely to reverse farmland bird declines in England. Results show that as currently implemented, ELS will not reverse farmland bird declines.

P6.5

Cross-crop benefits: Developing crop combinations to promote conservation biological control

Georgina Key (Lancaster University), Felix Wäckers (Lancaster University Biobest), Andy Wilby (Lancaster University)

This study tested the impact of floral resources provided by intercropped pharmaceutically-useful flower species on biological control of Brassica pests. Of the three species (borage, buckwheat, feverfew), buckwheat maintained higher abundances of parasitoids and enhanced pest control more than the other two species. Generalist predators followed pest aggregations, specialists were most abundant in the floral strips, declining with increasing distance.

P6.6

From Nutrient Pulses to continuous Flux – How Arbuscular Mycorrhizal Fungi (AMF) can contribute to sustainability in Agriculture – A Modeling Study

Joachim U Kleinmann (Helmholtz Centre for Environmental Research - UFZ Department of Ecological Modelling), Karin Johst (Helmholtz Centre for Environmental Research - UFZ Department of Ecological Modelling), Thomas Fester (Helmholtz Centre for Environmental Research - UFZ Department of Environmental Microbiology), Frank Zielinski (Helmholtz Centre for Environmental Research - UFZ Department of Environmental Microbiology), Karin Frank (Helmholtz Centre for Environmental Research - UFZ Department of Ecological Modelling)

Soil nutrient pulses caused by agricultural management implicate the risk of nutrient loss due to groundwater leaching, emissions to atmosphere or spatial unavailability for roots. Using a mathematical modeling approach we demonstrate that AMF-networks are able to transform nutrient pulses into smoothed fluxes and thus can serve as nutrient buffers in agroecosystems.

P6.7

Predicting the responses of insect pests and natural enemies to land use change

Richard N German (University of Leeds), Tim G Benton (University of Leeds)

Landscape management for conservation biocontrol needs a sound evidence base. We modelled how vegetation composition and configuration at multiple scales influences abundance of aphids, parasitoids and syrphid larvae in wheat fields, then used these models to predict synergies and trade-offs for multiple natural enemies under simulated land use change scenarios. Arable expansion with increased aggregation caused the least desirable outcomes.

P6.8

Can pollinators recover climate-driven losses in crop yield?

Jacob Bishop (University of Reading), Hannah E Jones (University of Reading), Martin Lukac (University of Reading), Simon G Potts (University of Reading)

As our climate changes there is increased risk of crop yield losses due to heat and drought stress at flowering. Here, we investigate whether increased abundance of insect pollinators can minimise yield loss, through their role in transferring fertile pollen to heat damaged male-sterile flowers of faba bean (*Vicia faba*).

P6.9

'Improving pest control & pollination services by means of 'multi-functional' flowering strips in cider apple orchards: the role of floral composition'

Alistair J Campbell (Lancaster University), Peter Sutton (Syngenta UK), Andrew Wilby (Lancaster University), Maily Lampariello (University of Angers), Felix L Wackers (Lancaster University)

Foraging behaviour and competitive interactions of beneficial insects were tested in experimental pollinator-targeted, natural enemy-targeted or combined flowering strips in Herefordshire cider apple orchards. We found combined strips attracted a greater diversity of beneficial insects than 'targeted' mixes and contrary to prediction, no evidence of trade-offs in visitor abundance or foraging patterns, suggesting that targeted mixes can be

effectively combined.

P6.10

Responses of predatory arthropods in homegardens to complexity gradients in Ethiopian agroecosystems

Debissa Lemessa (Stockholm university), Hylander Kristoffer (Stockholm university), Hambäck Peter (Stockholm university)

We studied predatory arthropods in 40 homegardens in Ethiopia that varied in amount of tree cover and distance to forests. We found that the abundance of spiders and pooled groups was higher in homegardens with high coverage of trees within a 100 x 100 m. Understanding of how predatory arthropods communities respond across landscapes can have implications for pest control.

P6.11

Wheat fields as ecological trap: the *Mabuya vittata* case study

Guy Rotem (Ben Gurion University), Yaron Ziv (Ben Gurion University), Amos Bouskila (Ben Gurion University), Itamar Giladi (Ben Gurion University)

Ecologists assume that natural patches within agricultural fields promote the maintenance of biodiversity. Individuals of *Mabuya vittata* of better shape intensively moved from the patches into the fields. The *M. vittata* population kept growing within wheat fields until the harvest with no movement back to the patches. After the harvest no *M. vittata* individuals have been survived within the fields.

P6.12

Microclimate and vegetation function as indicators of thermodynamic efficiency in agricultural landscapes.

Catherine Norris (Writtle College), Peter Hobson (Writtle College), Pierre Ibisch (Eberswalde University for Sustainable Development)

Agriculture is a significant driver of environmental change and biodiversity loss. A study of agricultural microclimates in East Anglia, UK, demonstrated attenuated temperatures in

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organic and set-aside plots when compared to conventional cropping systems. Biomass storages (soil organic carbon) and vegetation functionality were enhanced in these systems. Results are discussed in the context of thermodynamics, ecosystem resilience and climate change.

P6.13

Effects of herbicide on ecological patterns of characteristic and rare arable weeds

Roser Rotchés-Ribalta (University of Barcelona), Céline Boutin (Environment Canada), Jose Manuel Blanco-Moreno (University of Barcelona), David Carpenter (Environment Canada), Francesc Xavier Sans (University of Barcelona)

Arable weeds comprise some species which have drastically reduced their presence in last decades; however, at the same time, some other species seem to thrive well, in spite of current weed management. We performed a phylogenetically controlled experiment on herbicide phytotoxicity to unravel the role of two commonly applied herbicides on current patterns of weed frequency in Catalan fields.

P6.14

The importance of linear landscape feature combinations for farmland biodiversity and ecosystem service provision

Rosalind F Shaw (Environment and Sustainability Institute), David W Macdonald (Wildlife Conservation Research Unit), Ruth E. Feber (Wildlife Conservation Research Unit)

A key feature of agri-environment schemes is the management of linear landscape features such as field margins, hedgerows and ditches. The ecological relationships between the biodiversity of these habitat types are poorly understood. We surveyed the plant, pollinator and ground invertebrate communities of different feature combinations in agricultural land to determine their value for biodiversity and provision of ecosystem services.

P6.15

Weed harrowing prevents crop yield losses while maintaining a rich weed flora in organic cereal fields

Laura Armengot (University of Barcelona), Laura José-María (University of Barcelona),

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Lourdes Chamorro (University of Barcelona), F. Xavier Sans (University of Barcelona)

One of the main challenges of sustainable agriculture is the reduction of crop yield losses due to the competition with weeds while preserving a diverse weed flora. This study reveals that weed harrowing in organic dryland cereal fields prevents weeds from being a limiting factor for crop production and at the same time it maintains a rich flora.

P6.16

Measuring local ecosystem services of small-scale agricultural producers as a decision support tool for climate adaptation

Jessica Thorn (University of Oxford)

Measuring ecosystem-services to incentivize sustainable land-management is gaining global attention, however quantifiable assessments of the state of services at the landscape level, and how they are influenced when forced with climate change predictions, have not been developed. Findings present trials of such a method in Nepal, combining ecological surveys and participatory-action-research techniques, to establish a decision-support tool for vulnerability assessments and prioritizing adaptation interventions.

P6.17

Wessex BESS: Biodiversity and Ecosystem Services in Multifunctional Landscapes

Tom H Oliver (Centre for Ecology and Hydrology)

This poster will introduce the 4-year consortium project funded under the NERC Biodiversity and Ecosystem Services for Sustainability programme. The aim of the project is to understand how biodiversity underpins the ecosystem functions and services that (lowland) agricultural landscapes provide. The poster will summarise the five work packages in Wessex BESS, each considering different ecosystem functions and services, along with a scenario development and integrated spatial modelling aspect.

P6.18

The Impacts of Biomass Crops on Farmland Birds

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Henrietta E K Pringle (Imperial College London), Simon R Leather (Harper Adams University College), Rufus B Sage (The Game and Wildlife Conservation Trust)

Miscanthus and willow short-rotation coppice (SRC) are the main crops grown specifically for energy production in the UK, but there is concern that the expansion of this industry will pose a risk to farmland birds. This study therefore examines the breeding success of lapwings (*Vanellus vanellus*), a conservation priority species, in these crops.

P6.19

Interaction mathematical model and applications on integrated pest management

Wesley A. C. Godoy (University of São Paulo), Ana Paula M. B. Battel (University of São Paulo), Rafael A Moral (University of São Paulo)

Recent ecological modeling approaches have been directed to evaluate the effect of insecticides in the predator-prey or host-parasitoid dynamics. In this study, new modelling approaches are proposed in order to consider the effects of stochasticity associated to insecticide spreading and periodicity in the application, on the dynamics of pests and natural enemies in a agroecosystem context.

P6.20

Gamebird feeding hoppers provide winter food for non-target wildlife species including declining songbirds on small farms in the East Midlands, England

James Littlemore (Moulton College), Sean Willmer (Moulton College)

Gamebird feeding hoppers were monitored at mixed farms in the East Midlands using camera traps. Hoppers were used by a total of 27 species, and surprisingly gamebirds made up only 12 % of total observations compared to 28 % for songbirds. Supplementary feeding may positively affect songbird survivorship at a time when natural food resources are scarce.

POSTER: CLIMATE CHANGE ECOLOGY P7.1

Interannual snow cover variability and extreme events control ecosystem processes in the high Arctic

Elisabeth J. Cooper (Tromsø University), Philipp Semenchuk (Tromsø University)

Climate change models suggest future changes in state (solid vs. fluid) and rates of precipitation in the high Arctic, with potential impacts on ecosystem processes. Using snow fences we created a gradient of snow cover thickness and snow melt timing. We found that changes in snow depth and extreme winter warm spells can significantly impact plant performance and reproductive success.

P7.2

How will climate change alter host-parasite relationships?

Emma L Gillingham (Cardiff University), Jo Cable (Cardiff University), Annapaola Rizzoli (Fondazione Edmund Mach), Sarah E Perkins (Cardiff University)

Changes in climate are causing increasing ecological disruption, and the development rate of parasites with free-living stages may be affected. Altitude was used as a natural proxy for climate change and the parasite community of wild rodents at low (warmer and wetter) and high (colder and drier) altitudes were investigated.

P7.3

Spatial abundance of European migrant birds and the role of the environmental niche

Christine Howard (University of Durham), Phil A. Stephens (University of Durham), James Pearce-Higgins (BTO), Steve G. Willis (University of Durham)

Recent work has shown that populations of many trans-Saharan migrant birds are declining substantially across Europe, whereas resident species are maintaining a more favourable conservation status. Here I use environmental niche models to assess the relative roles of climate and land-use in driving the local abundance patterns of migrant birds.

P7.4

Cascading Effects of Climate Warming Across a Wetland Food Web

James O Vafidis (Cardiff University), Robert J Thomas (Cardiff University), Hefin Jones (Cardiff University), Ian P Vaughan (Cardiff University), Rob Parry (Wildlife Trust)

The productivity and phenology of lower trophic levels in wetland food webs are predicted to be influenced by climate warming. Such responses may have ramifications for higher trophic level consumers. This study examines the impacts of temperature-driven changes cascading across a wetland food web. Important behavioural and physiological responses to an altered prey resource by long-distance migrant birds are revealed.

P7.5

Trophic cascades in a changing environment: the impact of elevated CO₂ on multi-trophic interactions

William T Hentley (Centre for Ecology and Hydrology), Rosemary S Hails (Centre for Ecology and Hydrology), Scott N Johnson (University of Western Sydney), T Hefin Jones (Cardiff University), Adam J Vanbergen (Centre for Ecology and Hydrology)

The ecological consequences of rising CO₂ concentrations on plant-herbivore interactions are genotype- and species-specific. Relatively little is known of how elevated CO₂ concentrations will influence higher trophic levels. We explore this empirically using multiple plant-genotypes of European red raspberry, the large raspberry aphid and its associated natural enemies, the harlequin ladybird and the parasitoid wasp, *Aphidius ervi*.

P7.6

An investigation of the impact of peatland drain-blocking on export and concentrations of DOC in surface water.

Zhuoli Zhang (Durham University), Emily Kate Turner (Durham University)

The study is based on data gathered between 2008 and 2012 in the Moor House NNR, northeast England. The concentration of DOC in streams decreases upon drain blocking. The magnitude of the effect decreases with increasing catchment size. For DOC export it was shown that the observed decrease was largely explained by water yield variation rather than drain blocking.

P7.7

Micro-climate as a driver of consumer phenology

Sophie C Bell (Imperial College London), Alex Lord (Imperial College London), Ian PF Owens (Imperial College London)

Global-warming has caused earlier seasonal phenologies. Temperature is a proximate cue for plants, but not necessarily for other species or functional groups within the ecological network. In place of 'local' temperature measures used in other studies, individual-specific temperatures are modelled here to predict consumer phenology. This illustrates a variance across a single study site comparable to that at a national-scale.

P7.8

Synthesis a hybrid molecule of Benzimidazole as anticancer agents by assessed green organic chemistry

Mohd Rashid, Asif Husain, Ravinesh Mishra, Sameya Anjum, Shama Parveen. Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Jamia Hamdard (Hamdard University), New Delhi-110062, India

Mohd Rashid (Jamia hamdard)

Organic synthesis by non-conventional/modern methods is rapidly gaining importance in view of the fact that the use of many toxic and volatile organic solvents contributes to pollution. Compound 4j (NCS: 761980) exhibited remarkable activity with Mean GI₅₀ = 12.62 μM, TGI > 100 and LC₅₀ > 100 in compare to standard drug (Bendamustine, □ NSC: 138783, Mean GI₅₀, 60 μM, TGI > 100 and LC₅₀ > 100).

□

P7.9

The importance of dispersal ability and habitat availability in determining rates of range shifting

Louise Mair (University of York), Jane K Hill (University of York), Chris D Thomas (University of York)

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We aim to determine the relative importance of dispersal ability and habitat availability on rates of range shifting observed in British butterflies using a novel metric: the colonisation distance distribution. Statistical models are used to relate this metric to species' mobility, changes in abundance and habitat availability in the landscape.

POSTER: PARASITES PATHOGENS AND WILDLIFE DISEASE

P8.1

Wildlife Disease & Contaminant Monitoring & Surveillance Network

Ellie Sherrard-Smith (Cardiff University), Richard F Shore (Centre for Ecology and Hydrology), Gloria M Pereira (Centre for Ecology and Hydrology), Dr Elizabeth A Chadwick (Cardiff University)

The Wildlife Disease & Contaminant Monitoring and Surveillance (WILDCOMS) network (<http://www.wildcoms.org.uk/>) brings together nine of the major UK surveillance schemes that monitor one or more sentinel species for multiple diseases and / or contaminants. WILDCOMS will provide an integrated, national overview of environmental disease and contaminant risk and maximise dissemination of such information.

P8.2

Grey squirrel control in Scotland: efficacy and impacts on parasite dynamics

Amelia Brereton (University of Aberdeen), Sandra Telfer (University of Aberdeen), Sarah Burthe (Centre for Ecology and Hydrology), Peter Lurz (.)

Invasive species can impact the dynamics of native species and their parasites, and introduce exotic parasites. This project evaluates the effectiveness of grey squirrel control and factors affecting success, and samples squirrels from controlled populations to improve understanding of (i) the occurrence, prevalence and transmission of different parasites and (ii) how control, population structure and landscape connectivity influence infection prevalence.

P8.3

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Geometry for the immune herd

Klara M Wanelik (Department of Zoology University of Oxford), Charles Godfray (Department of Zoology University of Oxford), Miles Nunn (Centre for Ecology Hydrology UK), Ben C Sheldon (Department of Zoology University of Oxford), Sarah Wanless (Centre for Ecology Hydrology UK), Angela R McLean (Department of Zoology University of Oxford)

Common guillemots (*Uria aalge*) form dense breeding colonies on land where they are parasitised by the seabird tick (*Ixodes uriae*) and the pathogen it transmits, *Great Island Virus* (GIV). We are developing population models which explore the hypothesis that the social behaviour of this colonial bird maintains high level herd immunity within breeding groups.

P8.4

A field-scale experiment of disease transmission in a natural multi-host community.

Susan M Withenshaw (University of Liverpool), Amy Pedersen (University of Edinburgh), Andy Fenton (University of Liverpool)

Understanding how ecological communities maintain disease is useful for predicting and reducing disease risk. Many parasites infect multiple host species and transmit within and between them at different rates; therefore hosts contribute disproportionately to disease maintenance, but this is difficult to measure. Transmission of parasites (*Bartonella* spp.) was experimentally manipulated in rodent communities to determine host contributions to disease maintenance.

P8.5

The Environmental Epidemiology and Dynamics of Enteric Bacteria in Blue Tits

Rachel Hope (Lancaster Environment Centre Lancaster University), Ken Wilson (Lancaster Environment Centre Lancaster University), Ian Hartley (Lancaster Environment Centre Lancaster University), Glenn Rhodes (Centre for Ecology and Hydrology Lancaster), Roger Pickup (School of Health and Medicine Lancaster University), Clare Benskin (Lancaster Environment Centre Lancaster University)

The gut microbiome is closely associated with individual health in a range of taxa, yet the factors determining its composition and impact are poorly understood, especially in birds. This study used molecular approaches to quantify the spatio-temporal dynamics of the gut microbiota of a passerine bird population and used a cross-fostering experiment to

investigate their effects on host fitness.

POSTER: EVOLUTIONARY ECOLOGY

P9.1

Aphid secondary endosymbionts: different aphid host, different story

Hannah Clarke (The James Hutton Institute Dundee The University of Dundee), Alison Karley (The James Hutton Institute Dundee), Alison Karley (The James Hutton Institute Dundee), Danny Cullen (The James Hutton Institute Dundee), Danny Cullen (The James Hutton Institute Dundee), Stephen Hubbard (The James Hutton Institute Dundee University of Dundee University of St. Andrews), Stephen Hubbard (The James Hutton Institute Dundee University of Dundee University of St. Andrews)

The secondary endosymbiont *Hamiltonella defensa* in association with the APSE bacteriophage confers resistance in pea aphids to a common parasitoid wasp. In potato aphids, however, the lowest parasitism rates do not correspond to the presence of *H. defensa*, suggesting another mechanism of parasitoid resistance and another role for the secondary endosymbiont.

P9.2

What is the ecological and adaptive significance of polyploidy in *Alloteropsis semialata*?

Marjorie R Lundgren (University of Sheffield), Colin P Osborne (University of Sheffield)

The grass *Alloteropsis semialata* is the only species known to use both C3 and C4 photosynthesis. Interestingly, it produces morphological and anatomical gradients between these discrete pathways, forming C3-C4 intermediate forms. Our research aims to unravel whether C3 and C4 populations are interbreeding to create intermediate forms and what role polyploidy may be playing in the evolution of this species.

P9.3

SSR analysis of population genetic structure of a hybrid zone between

Leucospectrum japonicum* and *L. stellipium

Yue Li (Tohoku University), Masayuki Maki (Tohoku University)

Genetic structure of a natural hybrid zone between *Leucospectrum japonicum* and *L. stellipium* was examined by eight microsatellite loci. Our preliminary results indicated that some sympatric putative parent-like populations are not of late parental backcrossing origin, but consisted of pure parent species. Ongoing study will focus on other sympatric hybrid populations.

P9.4

Problem-solving performance and life history traits in Great Tits (*Parus major*)

Laure Cauchard (University of Montreal), Blandine Doligez (University of Lyon 1), Neeltje Boogert (University of St Andrews)

We investigated the relationship between problem-solving performance, individual quality and measures of reproductive success in a wild population of great tits (*Parus major*). Our results open new perspectives on the evolution of cognitive abilities, calling in particular for investigating the costs associated with cognitive abilities and the mechanisms maintaining between-individual variation in cognitive abilities in natural populations.

P9.5

Phylogenetic Patterns in phenology: Myrtaceae along the Atlantic rainforest, Brazil

Vanessa G Staggemeier (Universidade Federal de Goiás), Patrícia Morellato (Universidade Estadual Paulista), Eliana Gressler (Universidade Estadual Paulista), Valesca Ziparro (Universidade Estadual Paulista)

Myrtaceae is among the most important Atlantic Rainforest plant families. We aim to understand its reproductive patterns and the influence of climatic factors and phylogenetic constraints. Taking into account Myrteae phylogeny and individual-based phenology across three ARF sites, we demonstrate the combined influence of climate and phylogeny on Myrteae reproduction, adding a new perspective to phenological research in tropical forests

P9.6

The effects of plasticity and local adaptation on spring phenology of UK plant species.

Christine Tansey (The University of Edinburgh)

Patterns of phenological change have been observed for several taxa in recent years. Using data from the UK Phenology Network the effects of plasticity and local adaptation on spring phenological events of UK plant species can be investigated. These techniques use data collected by citizen scientists to explore macroecological processes and look for signals of evolutionary change.

P9.7

Selection from herbivores and pollinators on floral traits in a natural hybrid zone of two supergeneralist plant species

Rubén Torices (University of Coimbra), Alicia Agudo (Real Jardín Botánico. Consejo Superior de Investigaciones Científicas.), Ana Afonso (University of Coimbra), Lucie Mota (University of Coimbra), Alberto Herrero (Real Jardín Botánico. Consejo Superior de Investigaciones Científicas.), Inés Alvarez (Real Jardín Botánico. Consejo Superior de Investigaciones Científicas.)

Hybrid zones constitute an ideal framework to investigate evolutionary processes and mechanisms, such as selective pressures on phenotypic traits. We studied the role of floral traits on reproductive success by exploring herbivores and pollinators preferences within a natural hybrid zone of two supergeneralist plant species with different floral display: *Anacyclus clavatus* with rayed heads, and *A. valentinus*, with rayless heads.

P9.8

Floral competition leads to sexual specialization within inflorescences

Rubén Torices (University of Coimbra), Ana Afonso (University of Coimbra), Marcos Méndez (University Rey Juan Carlos), Jose M. Gómez (University of Granada), Arne A. Anderberg (Swedish Museum of Natural History)

Many angiosperms show sexual segregation within their inflorescences. Using the largest family of flowering plants as a model, we found out that floral density within an inflorescence, considered as a proxy of flower competition, led to sexual specialization of flowers within inflorescences. Therefore the increase of flower competition could favour the

sexual specialization by the action of sexual selection.

P9.9

As the Dragon Flies: Population Structure in *Sympetrum* Dragonflies

Jocelyn L Faydenko (Central Michigan University), Bradley J Swanson (Central Michigan University)

We examined dragonfly population structure using AFLP markers for the White-faced Meadowhawk (*Sympetrum obtrusum*) in Michigan, USA. We used two AFLP loci producing 200 alleles to compare three populations of dragonflies. Adults and juveniles comprised separate genetic populations within the same location; each breeding pond comprised a different genetic population, and each year of juveniles comprised a unique genetic population.

P9.10

It's not so lonely at the top: A comparison of genetic variation in demersal and pelagic fish

Thomas A McVay (Central Michigan University), Bradley J Swanson (Central Michigan University)

We compared the heterozygosity and average number of alleles between pelagic and demersal fish from 68 species. We found that pelagic fish had a greater number of alleles and higher heterozygosity than demersal fish. This trend continued when refining the categories by depth. This suggests that, on average, the effective population size of pelagic fish are greater than demersal species.

P9.11

Do you want that supersize?

Elizabeth C. Bourne (Freie Universitat Berlin), Diogo Mina (Universidade de Coimbra)

Cenococcum geophilum is a widespread ecotomycorrhizal fungal (EMF) species showing a broad ecological tolerance. We present flow cytometry estimates of genome size for a large number of natural isolates from across four populations, revealing an unexpectedly

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large and variable genome, and discuss the consequences for the ecology and evolution of this species.

P9.12

Less is more: Mate choice and offspring viability in the burying beetle

Judith E Lock (University of Southampton), Victoria T Montrose (Hartpury College Associate Faculty of University of the West of England), Melanie Gibbs (Centre for Ecology Hydrology), Per T Smiseth (University of Edinburgh), Allen J Moore (University of Exeter in Cornwall and University of Georgia)

When competing for females, larger males typically have increased success, especially when reproduction depends on winning and defending a resource. Male and female burying beetles defend small vertebrate carcasses, required for reproduction. We eliminated male-male competition, and found that females preferred smaller males, due to the direct benefit of him providing more care and producing fitter offspring.

POSTER: FOREST ECOLOGY

P10.1

Population dynamics of *Ips typographus* in the Bohemian Forest (Czech Republic): validation of the phenology model PHENIPS and impacts of climate change

Ludek Berec (Biology Centre ASCR Ceske Budejovice Czech Republic), Petr Dolezal (Biology Centre ASCR Ceske Budejovice Czech Republic), Martin Hais (University of South Bohemia Ceske Budejovice Czech Republic)

We validate the published *Ips typographus* phenology model PHENIPS for the Bohemian Forest, finding reasonable agreement between modeled and actually observed bark beetle dynamics. Also, we study impacts of climate change on this species. If both temperature mean and variance will grow, brood development time does not change much and initiation of the third generation will occur only for relatively large temperature shifts.

P10.2

Earning an unwanted place in the IUCN Red List

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Natalia Tejedor (Bournemouth University), Adrian Newton (Bournemouth University), Sara Oldfield (BGCI)

Conservation of montane forests in the tropical Andes entails many challenges. Threats responsible for increasing the risk of species extinction require management responses, which reduce deforestation, encourage restoration and sustainable forest management. Which species and where to establish these responses can start with an unwanted place in the IUCN Red List.

P10.3

Geographical variation of seed traits and seed predation in *Juniperus thurifera*

Lucía DeSoto (Universidade de Coimbra), David Tutor (Universidad de Valladolid), Rubén Torices (Universidade de Coimbra), Susana Rodríguez-Echeverría (Universidade de Coimbra), Cristina Nabais (Universidade de Coimbra)

Seed traits determine plant establishment success being essential for forest conservation. Particularly, low germination rates constrain recruitment and might constitute a bottleneck in endemic Mediterranean juniper woodlands. We evaluated the geographical variation of seed number, size and germination of *Juniperus thurifera*; and the role of pre-dispersive seed-predation on seed traits across its range.

P10.4

Canopy structure of broadleaf forests and conifer-broadleaf mixed forests on tropical and subtropical mountains analyzed by portable LIDAR system

Shin-ichiro Aiba (Kagoshima University), Kosuke Akutsu (University of the Ryukyus)

By using portable light detection and ranging (LIDAR) system, we quantified canopy structure of evergreen forests with varying dominance of conifer along elevational gradients on tropical and subtropical mountains (Mount Kinabalu, Borneo and Yakushima Island, Japan). Conifer-dominated forests had sparser canopy and denser understory than angiosperm-dominated forests; lowland forests and subalpine scrub on Kinabalu were exceptions.

P10.5

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Effects of canopy development on woody species regeneration in early stages of succession in secondary tropical dry forests

Géraldine Derroire (Bangor University), John Healey (Bangor University)

Our poster proposes a review of the interactions between species forming the early canopy of secondary tropical dry forests and the woody regeneration underneath, assuming that these interactions can influence the composition of later stages of succession. We focus on mechanisms and micro-scale environmental factors underlying these interactions and consider all stages of regeneration (seed production, dispersal, germination and establishment).

P10.6

Tree and shrub layer changes in Wytham Woods, 1974-2012

Keith J Kirby (Department of Plant Sciences Oxford)

Permanent plots established in 1974 in Wytham Woods have been recorded at roughly decadal intervals since, most recently in 2011-12. The canopy cover overall remains high though some individual plots have become more open while others have closed over. Ash (*Fraxinus excelsior*) is tending to increase while oak (*Quercus robur*) is declining.

POSTER: LARGE SCALE ECOLOGY - LANDSCAPES METAPOPOPULATIONS AND MACROECOLOGY

P11.1

Fractal Geometry as a tool for understanding *Zostera marina* Ecology in a dynamic landscape

Mike A Irvine (University of Warwick), Jim C Bull (University of Warwick), Matt J Keeling (University of Warwick)

Spatial data such as satellite or aerial photographs have become more widely available and can offer faster and cheaper indicators of environmental threats than more traditional ecological approaches. Here we consider Fractal Analysis applied to *Z. marina* data gathered from the Scilly Isles and show how it can provide insights into the spatial

distribution of Seagrass patches.

P11.2

Trajectories of carbon pool and plant biodiversity recovery in secondary and restored tropical forests

Philip A Martin (Centre for Ecology and Hydrology Bournemouth University), James M Bullock (Centre for Ecology Hydrology), Adrian C Newton (Bournemouth University)

Both REDD+ and the Convention on Biological Diversity aim to enhance carbon stocks and biodiversity through tropical forest restoration. However, we lack evidence of the effectiveness of such management. Using data from tropical forest chronosequence and restoration studies we investigate the recovery of carbon pools and plant biodiversity in recovering forests and determine factors limiting recovery.

P11.3

Adapting the incidence function model and its parameters for use in urban conservation planning

Laura J Graham (University of Nottingham)

Urban ecology and conservation are increasingly focused on in both policy and theory. Here I refine Hanski's incidence function model, for application to urban ecology. I present the model diagrammatically, showing the changes. Using the new model with urban data, I explore the effects and implications of proposed policy changes.

P11.4

Shedding subspecies: the influence of genetics on reptile subspecies taxonomy

Shannon M Torstrom (Central Michigan University), Bradley J Swanson (Central Michigan University)

We reviewed how genetic techniques influence taxonomic change in reptile subspecies. Studies were noted for potential influential variables, number of subspecies tested, and final number of subspecies. We show subspecies were often elevated to a unique species

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or when unaltered, increased sample size and marker diversity were recommended. Determining appropriate phylogenetic relationships can significantly impact management and conservation strategies.

P11.5

Can trait-based analyses of distribution change be generalised to new geographic areas?

Gary D Powney (CEH Imperial College London), Christopher D Preston (Centre for Ecology Hydrology), Andy Purvis (Imperial College London), Wouter Van Landuyt (Research Institute for Nature and Forest (INBO)), David B Roy (Centre for Ecology Hydrology)

We examined the ability of trait-based models to predict change in new geographic regions. Using models of plant distribution change in Flanders and six regions of Britain, we found that predictive ability was positively related to land cover similarity. This suggests it may be possible to use trait-based models to predict change between regions that share similar land cover compositions.

P11.6

Can large-scale patterns in insect atlas data predict local occupancy?

Louise J Barwell (University of Leeds Centre for Ecology and Hydrology), Nick Isaac (Centre for Ecology and Hydrology), Bill Kunin (University of Leeds)

Accurate estimates of fine-scale species' occupancy can inform reserve design and red-listing decisions. The predictions of a suite of methods for downscaling coarse-scale occupancy are compared to observed occupancy at the 1x1km scale for dragonflies, butterflies and moths. Using monitoring scheme data, we also test how well these predictions correlate with indices of abundance at the population scale.

P11.7

Influence of landscape context on ditch bank plant diversity in agricultural areas.

Lisa Favre-Bac (EcoBio Université Rennes 1), Aude Ernoult (EcoBio Université Rennes 1), Cendrine Mony (EcoBio Université Rennes 1), Yann Rantier (EcoBio Université Rennes 1), Jean Nabucet (Costel Université Rennes 2), Françoise Burel (EcoBio Université

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Rennes 1)

In intensive agricultural areas, linear elements (ditches, grassy strips, hedgerows...) may play a double role of refuge habitat and corridor for biodiversity. We investigated plant communities of 270 ditch banks located on 30 contrasted networks in northern France, to understand the influence of landscape context on ditch bank plant diversity.

P11.8

Processes controlling carbon fluxes in the Swedish boreal forest.

David Hadden (Swedish University of Agricultural Sciences), Michael Freeman (Swedish University of Agricultural Sciences), Achim Grelle (Swedish University of Agricultural Sciences)

The Boreal forest plays a significant role in quantifying the global carbon budget. We have long term data sets of carbon fluxes and climate data which we analyse to improve the understanding of processes that control whether a forest will act as a carbon source or as a carbon sink.

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P11.9

A Landscape generator and its application as tool for integrated regional environmental impact assessment of bioenergy activities

Sandro Pütz (UFZ – Helmholtz Centre for Environmental Research), Jeroen Everaars (UFZ Helmholtz Centre for Environmental Research), Daniela Thrän (UFZ Helmholtz Centre for Environmental Research), Karin Frank (UFZ Helmholtz Centre for Environmental Research)

We present a landscape generator aiming to understand the environmental impacts of bioenergy use on the environment including future climate change at the landscape level. This approach will include exemplary studies of bioenergy impacts on biodiversity, aspects of spatial effects of the landscape on populations, which are exemplarily shown with an application to an agrarian birds simulation model.

P11.10

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Assessing the suitability of an environment for breeding golden plover (*Pluvialis apricaria*) with the use of GIS and remotely sensed imagery

Heather Crump (Aberystwyth University), Mick Green (Ecology Matters), Richard Lucas (Aberystwyth University)

Declines in Welsh golden plover populations may be linked with changes to the suitability of breeding habitat. Through utilisation of remotely sensed imagery and GIS data, the suitability of areas are assessed both for present day and the reconstruction of past conditions from earlier imagery. This allows changes in the environment to be measured even where contemporary surveys are unavailable.

P11.11

Stability of predator-prey metapopulation dynamics in fragmented environments, a case study using model protozoa

David JS Montagnes (University of Liverpool), Jen Cooper (University of Liverpool)

Landscape fragmentation is a key driver of population dynamics across many environments. As such, processes leading to fragmentation and their effects have received attention in relation to metapopulation dynamics. We proposed that intermediate fragmentation per se provides optimal conditions for maintaining populations and test this by assessing patterns of protozoan dynamics in microcosms.

P11.12

Effects of landscape heterogeneity on carabid beetles and plants gamma diversity in agricultural area.

Rémi DUFLOT (CNRS - UMR ECOBIO), Romain GEORGES (CNRS - UMR ECOBIO), Stéphanie AVIRON (INRA SAD Paysage), Aude ERNOULT (CNRS - UMR ECOBIO), Françoise BUREL (CNRS - UMR ECOBIO)

We analysed the effects of landscape composition and spatial organisation on plant and carabid beetle gamma diversity. We tested a binary (semi-natural covers vs. crops) and a functional (community-based) classification of cover classes. Using the later approach, a better explanation of species richness variations was found for both taxa and landscape descriptors have also been related to life history traits.

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DISEASE PESTICIDES AND ECOSYSTEM SERVICES**

P12.1

Assessing fitness and rarity in UK bumblebees.

Sarah E Rustage (Plymouth University), Mairi E Knight (Plymouth University), Jonathan S Ellis (Manchester Metropolitan University), Richard Billington (Plymouth University), Mark J F Brown (Royal Holloway University of London)

This study compares the fitness of two British pollinator species of contrasting levels of abundance, *Bombus pratoruma* and *B. monticola*, by measuring phenoloxidase and antimicrobial peptide activity. Future work will compare these results with genetic data, to ascertain whether any differences in fitness are linked with variation in genetic diversity.

P12.2

Pollination service provision in Northern Ireland apple orchards

Lorraine McKendrick (Queens University Belfast), Robert J Paxton (Martin-Luther Universitat Halle), Tomas E Murray (Martin -Luther Universitat Halle), Sean MacAntSaoir (Agri-food and Biosciences Institute Loughgall)

In this study we demonstrate – and quantify – the shortfall in pollination of Co. Armagh commercial apples. Pollination is an essential ecosystem service and in this system it is mainly provided by honeybees and wild bumblebees. Surrounding landscape traits rather than local habitat features were best explanatory factors for variance in service provision in our study system.

P12.3

Understanding and managing pollinator flow across agroecosystems.

Jennifer B Wickens (University of Reading), Simon G Potts (University of Reading), Stuart PM Roberts (University of Reading)

Wild pollinators provide a vital ecosystem service with a recognised estimated value of

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£430 million a year to UK agriculture. Measures to potentially mitigate pollinator loss include the use of mass flowering crops and habitat provision through protected areas. This research investigates how pollinator communities vary spatially and temporally across gradients of oilseed rape and calcareous grasslands.

P12.4

The role of woody elements in agricultural landscapes for pollination of young cherry trees

Christof Schüepp (University of Bern), Felix Herzog (Agroscope), Martin Entling (University of Koblenz-Landau)

We studied the independent effects of amount of woody habitat in the landscape (habitat loss) and the isolation from the next woody habitat (habitat fragmentation) on pollination of cherry trees. The density of pollinating insects is reduced in landscapes with low amount of habitat but low distance to other cherry trees (high pollen availability) was more important for fruit set.

P12.5

Pollinators of coffee in Ethiopia - *Coffea arabica*'s native range

Ulrika Samnegård (Stockholm University Department of Botany), Peter A Hambäck (Stockholm University Department of Botany), Sileshi Nemomissa (Addis Ababa University Department of Biology), Kristoffer Hylander (Stockholm University Department of Botany)

Pollinators of coffee have been studied in many tropical regions around the world; however, the pollinators of *Coffea arabica* in its natural range in Ethiopia are mainly unknown. We have identified the main pollinators of *C. arabica*, under different shading strata, in a landscape in southwestern Ethiopia where wild *C. arabica* still exists in the understory of moist afro-montane forest.

P12.6

Double whammy? Impacts of pesticides and parasites on bumblebee fitness

Gemma Baron (Royal Holloway University of London), Dr Nigel E Raine (Royal Holloway

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University of London), Dr Mark J F Brown (Royal Holloway University of London)

Bees foraging in agricultural landscapes are exposed to a wide range of stressors such as pesticides and parasites, which could have negative impacts on fitness. It is vital to consider interactions between stressors as well as individual effects. This study investigates impacts of a commonly used pyrethroid insecticide (lambda-cyhalothrin) and a prevalent parasite (*Crithidia bombi*) on bumblebee colony fitness.

P12.7

Understanding and managing honey bee health in the UK: experimental protein supplementation of beekeeper-managed colonies

Emily C Adams (Lancaster University), Rebecca Ellis (Lancaster University), Ken Wilson (Lancaster University)

Beekeepers are a key stakeholder group for managing honey bee health in the UK. This study investigates whether managed honey bee colonies in the Lancashire area readily consume protein supplements. The results (part of a wider study into beekeeping) have implications for beekeeping practices and honey bee management in the UK.

P12.8

Modelling the responses of pollinators to anthropogenic threats in agricultural landscapes

Adriana De Palma (Imperial College London), Sean Tuck (Imperial College London), Tamera I Hussein (Imperial College London), Andy Purvis (Imperial College London)

Pollinator communities in agricultural systems face a variety of pressures, including habitat loss and degradation. We explore responses of pollinator diversity to these threats, allowing for non-linear relationships, using data on temporal and spatial variation in biodiversity and threat intensities collated from published literature. We also assess the explanatory power of remotely-sensed threat proxies.

P12.9

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Competition between honey bees and wild bees and the role of nesting resources in the Lüneburger Heath

Alexandra M Klein (Leuphana University), Anika Hudenwenz (Leuphana University)

For decades nature conservationists and bee keepers have been debating about possible competition effects between managed honey bees and wild bees. We found that wild bees visit less flowers when honey bees are abundant but this does not affect their reproductive success in the Lüneburger Heath, Germany. However the presence of nesting resources limits the reproductive success of wild bees.

P12.10

How do you Manage Pollination Services with Changing Communities?

Ciaran R Ellis (University of Stirling), Hannah Feltham (University of Stirling), Kirsty J Park (University of Stirling), Nick Hanley (University of Stirling), Dave Goulson (University of Stirling)

It is a challenge to provide pollination services for crops with a long-growing season, as the wild pollinator community changes over time. We present data from soft-fruit farms in Scotland suggesting that maintaining pollinators throughout the growing season requires the management of multiple taxa. Optimal management strategies to meet this challenge are presented.

P12.11

The effects of landscape context on wild bee assemblages over an urban-rural gradient in Birmingham, UK

Robert Fowler (University of Birmingham), Adam Bates (University of Birmingham), Mark Ledger (University of Birmingham), Jon Sadler (University of Birmingham)

In previous research urban habitats were found to boast a diverse array of bee species. Through recording wild bee species abundance and diversity in sites along an urban to rural gradient, we investigated species response to particular landscape contexts. With these data we explore the influence of the surrounding habitat on bee assemblages in Birmingham, UK.