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scrr
Scottish Consortium for Rural Research
formerly the Edinburgh Consortium for Rural Research

SCRR Newsletter
formerly The Bush Telegraph
Issue 84
Autumn 2015
www.scrr.ac.uk

PICTURE: CHRIS COMBE

The future of land reform in Scotland

Government plans to put more land in community ownership, so research must look at the possible effects, says Prof Stuart Monro, scientific director of SCRR

THE SCOTTISH GOVERNMENT has recently conducted consultation on land reform legislation that is likely to have widespread effects on rural communities. It proposes to complete the Land Register of Scotland within 10 years, to improve existing community rights to buy and to develop a strategy to put 1 million acres in community ownership by 2020.

These are political issues that are in the domain of our elected representatives. The concerns of the Scottish Consortium for Rural Research (SCRR) must be to ensure that decisions are made in the context of scientific evidence as to the consequences. What might be the environmental consequences of the legislation in terms of sustainable agriculture and biodiversity and the social consequences for communities? How might the legislation affect the management of the sensitive habitats within Scotland and plans for climate change mitigation?

The phrase 'known unknowns and unknown unknowns' springs to mind and it is only through independent research that the 'unknowns' can become 'knowns' and appropriate action taken by decision makers to avoid unintended consequences.

The provision of this independent research is the role of the diverse organisations associated with SCRR, some within the government structure and others outwith it. Collectively we must all gear up to address this challenge.

Above: Ardhasaig, North Harris, an area that has been owned by a community trust since 2003

This issue in numbers

£14 million is the estimated annual cost to farmers of sheep scab – **page 2**

30 years is how long the unmanaged Soay sheep of St Kilda have been studied – **page 3**

9 billion is the projected maximum global population by 2045 to 2050 – **page 4**

£4.23 billion is the annual value of Scotland's whisky, now the nation's biggest export – **page 4**

15 years is how long SRUC has been planting trees on its upland research farms, to show the benefits of integration – **page 7**

57% of rubber plantations in south-east Asia are in places where they might not be able to survive in the long term – **page 9**

About SCRR

THE SCOTTISH CONSORTIUM FOR RURAL RESEARCH exists to promote sharing of ideas and techniques among a group of organisations active in research into land, freshwater, coastal and marine resources, and their uses.

Our member organisations have bases throughout Scotland and are at work all over the world: details on the back page.

Members' reports

SRUC; Moredun Research Institute

Animal disease threats: how to handle them?

The Centre of Expertise on Animal Disease Outbreaks is helping farmers to prepare for future outbreaks

THERE HAS ALWAYS been a threat to farming from new diseases or new outbreaks of old ones, but with increased global travel and climate change those threats loom ever larger.

Currently led by SRUC, EPIC (Epidemiology Population Health and Infectious Disease Control) brings together expertise from seven Scottish research institutions as the Centre of Expertise on Animal Disease Outbreaks. It delivers independent, evidence-based advice to help prepare Scotland's livestock industry and related stakeholders for animal disease outbreaks. It has a particular focus on exotic diseases such as foot and mouth disease, classical swine fever and avian influenza.

PICTURE: CAROLINE FORD

Pig diseases are the next target for the EPIC project, following work with cattle, sheep and bird flu in hens

Of considerable importance and value is EPIC's analysis of livestock demographics and movement patterns – which combined with expert epidemiological knowledge of livestock disease, enables models of disease transmission to be developed. These map and predict the likely spread of disease, and predict the potential effects of any control strategies, such as vaccination or movement restrictions.

EPIC also monitors actual disease outbreaks, working closely with the livestock industry to ensure work is grounded in evidence and reflects on-farm reality. In the event of disease, EPIC works to quickly return Scotland to a disease-free status and to minimise damage to Scotland's rural economy.

EPIC has recently published a Scottish Sheep Scenario Planning report, complementing a cattle report published in 2014. It has been monitoring the risk of bird flu entering Scotland after it was identified in laying hens in Lancashire during July 2015.

Looking to the future, EPIC is closely monitoring pig diseases particularly classical swine fever and african swine fever, which are present in the EU, and porcine epidemic diarrhoea (PED) in the United States and Canada.

The right work done in 'peacetime' means Scotland is better prepared when disease outbreaks occur. EPIC is constantly monitoring industry so that any changes which may lead to new disease threats or the spread of existing diseases are spotted quickly.

Further information can be found at www.epicscotland.org

New sheep scab diagnostic test from Moredun

Drs Stewart Burgess and Alasdair Nisbet of Moredun Research Institute, Edinburgh, describe the new test

SHEEP SCAB IS a highly contagious endemic ectoparasitic disease of sheep caused by the sheep scab mite *Psoroptes ovis* and is currently notifiable in Scotland. The disease costs the industry more than £14m each year, including costs associated with lost performance, preventative measures and treatment.

The mite causes an intense irritation of the skin surface. Rather than piercing the skin, the mites abrade the skin surface with their mouthparts while feeding, whilst also depositing allergen-rich faecal pellets directly onto the skin, provoking an allergic reaction. This results in sheep rubbing, kicking, scratching and nibbling the affected area, causing inflammation and a scab to form at the site of infestation. These welfare issues are further compounded by sheep being unable to rest and also suffering from disrupted feeding patterns due to the intense irritation.

PICTURE: DONALD MACLEOD

Healthy sheep: the new test detects antibodies to a protein found only in sheep scab mite

The mite is usually transmitted by direct contact between sheep. However, because mites can exist off the sheep for up to 16 days, fence posts, trees, farm equipment – anywhere infested animals seek relief from the irritation by scratching and rubbing – can also be a source of infection. During the early stages of sheep scab, infestations are not obvious and animals often appear clinically normal. This sub-clinical stage can last for several weeks during which animals can act as a source of infection. For control or eradication programs to be successful it is crucial that all infested animals are identified, including sub-clinical cases.

The new test detects host antibodies to a protein found only in the sheep scab mite, which means that the test can accurately detect that an infestation is due to the scab mite and not another ectoparasite. The test can detect infested animals at an early stage and before the onset of clinical symptoms, which will be important in the effective control of the parasite.

Details at www.moredun.org.uk or from SAC Veterinary Services

PICTURES: ARPAT OZGUL

Soay sheep research on St Kilda reaches 30-year milestone

Josephine Pemberton of the Institute of Evolutionary Biology explains how this long-running project points to the value of long-term ecological data series

THE UNMANAGED SOAY SHEEP population on St Kilda has long fascinated ecologists because of its boom-and-crash population dynamics. In 1985, Tim Clutton-Brock (Cambridge) set up a study recording the entire life history of each animal living in the Village Bay area of the island of Hirta in order to understand how individual life histories build into the population dynamics. Funded principally by NERC, the study now runs from the University of Edinburgh's School of Biological Sciences and this year reached 30 years and 166 publications, making it one of the most detailed and productive long-term studies of a free-living animal of its kind. In July a meeting held at the Royal Society of Edinburgh showcased its findings.

Soay sheep originate on the island of the same name in the St Kilda archipelago

The population dynamics were a major talking point of the meeting. Under good conditions, Soays are strikingly productive – a 74% increase in population size was recorded in one year. Crashes occur when high density combines with bad winter weather and a high proportion of vulnerable sheep in the population (principally lambs and yearlings). Perhaps even more striking is that running through the time series is a net increase averaging 31 sheep per year on the island. This has been accompanied by a reduction in the mean body size. Meanwhile, plant productivity on the more productive swards has increased. Putting these pointers together, it is suggested that increased plant productivity and milder winters due to climate change are improving the over-winter survival of lambs, enabling poorly grown individuals to survive and thus increasing the average number of sheep whilst also shifting the average weights downwards.

These relationships are still under study, but strongly suggest that climate change will alter the carrying capacity of plant communities in NW Scotland. Long-term studies like this one, which follow marked individuals closely through their lifetimes, are essential if we are to fully understand how changes in the environment impact natural populations.

To find out more about the study, see soaysheep.biology.ed.ac.uk

Members' reports

SRUC; Centre for Nordic Studies, UHI

SRUC examines decision making in crop protection

How can farms assess the risk of disease to their crops, and respond to those risks, in a more rational manner?

SRUC'S CROP AND SOIL SYSTEMS (CSS) Research Group undertakes extensive and wide-ranging research exploring how to strike the balance of enhancing yield while protecting crop health in a sustainable way that minimises any negative impacts on the environment.

The world's population is projected to increase to a maximum of nine billion by 2045-2050, so in order to meet growing global and local demands for food, we need to develop resilient and sustainable systems of crop production.

Effective crop protection depends on the quality of decision-making (usually by a farmer or farm manager) in response to the threat of plant disease, in much the same way that the quality of shared decision-making by doctors and patients contributes to effective healthcare.

A recent feature article by SRUC in the journal *Plant Disease* discussed shared decision-making in the crop protection context and explored the multiple players that can be involved in decision making. It discussed some underpinning principles and methodologies that might be used to accumulate and quantify evidence in a rational way, with a view to reducing bias in the decision makers and arriving at better decisions. The full article is freely available on open access at apsjournals.apsnet.org/toc/pdis/99/9.

Good harvests depend on good decision making in response to disease threats

Crop protection at an individual farm level involves a decision-making process which starts with an initial assessment of disease risk, followed by the accumulation of evidence related to current risk factors, leading to a risk prediction. Risk factors in the crop protection context are the particular host, the pathogen and environmental factors that increase disease risk in any given plant pathosystem. The identification and quantification of disease risk factors has now become fundamental to modern epidemiology of all kinds of disease – plant, animal and human.

The action taken in response to these risks depends on the decision-owner, and we need to develop a method that allows the process to be based on rational assessment of evidence from different sources, rather than on intuition.

The fact remains that the effectiveness of shared decision-making in an agricultural setting may be extremely difficult to assess. Finding ways to do so is a priority because the quality of crop protection decision-making depends ultimately on effective knowledge exchange among all those involved in a decision process.

Raising Norse spirits – a potent research impact

UHI's Centre for Nordic Studies in Orkney and Shetland has helped create a whisky with a Viking heritage

SCOTCH WHISKY is now Scotland's largest international export (£4.23bn) ahead of refined petroleum (£3bn) and business services (£2.5bn). In early 2012, staff at the University of the Highlands and Islands' Centre for Nordic Studies, based in Orkney and Shetland, entered discussions with Gerry Tosh, global development manager with the Edrington Group, owners of Highland Park Distillery, on providing research to inform product and sub-brand development of a new range of high-end whisky products drawing on the Viking heritage of the Orkney islands, whose Mainland has been home to the Highland Park distillery since 1798.

The first collection marketed from this work was the Valhalla Collection, comprising whiskies based on the Norse gods Thor, Loki, Freya (the first time a whisky has been called after a woman) and Odin. These increased sales of Highland Park whisky and opened up a new Russian market based on academic input from the Centre – Russia was a Viking kingdom.

The success of the range has been so great that the company is continuing its engagement with the Centre in an even closer relationship, and there is exploration under way of options for new whiskies using other characters and symbols from Norse mythology and life, derived from the Centre's research.

Left: Freya, the first whisky named after a female

The product has attracted a high degree of global interest and 'Thor' won an IWSC Gold Award in 2012. Gerry O'Donnell, Public Affairs Director for the Edrington Group, which owns Highland Park Distillery, noted in a letter of commendation to the Centre, 'The international development of Scotch whisky has been built on the success of distinctive brands. Highland Park's Valhalla collection recognises the need to stand out from the crowd by creating an exciting, premium initiative that adds value to the brand'.

PICTURES: JAMES HUTTON INSTITUTE

Left: barley is Scotland's largest crop and the cornerstone of our brewing and whisky industries

Above: the IBIC industry day brought together key influencers from throughout the barley industry supply chain

Progress on International Barley Innovation Centre

The James Hutton Institute is working on a state-of-the-art centre to promote innovation relating to this important crop

JHI IS CURRENTLY in the developmental stage of realising their ambition to establish the UK's first barley innovation centre.

The state-of-the art centre will generate real benefits for the people and industries of Scotland and the rest of the UK. Located at the heart of the Institute's Invergowrie campus near Dundee, the centre will bring together researchers, small and medium enterprises, trade organisations and industrial partners, providing an open platform for the development of new barley crop solutions and supporting large-scale, industry-focused research.

In August 2015, the James Hutton Institute hosted an industry round-table event as part of the project's scoping and planning process. The event brought together key influencers from across the industry supply chain, giving them an opportunity to input into a process that will ultimately benefit them, providing a more focused approach to the development of barley varieties.

Philip Gane, the Institute's capital projects manager, said: 'Identifying industry needs is vital to ensuring they are embedded in the concept, governance and research aims of the new facility. We're pleased to welcome leading individuals from industry with an interest in the barley value chain to a key workshop held in Dundee.

'Success in establishing the International Barley Innovation Centre would [create] the UK's first centre for barley research. Researchers here have been working hard to not only safeguard the future of barley production, but also improve the quality of current crops resulting in better drams and pints for everyone.'

SCRR Annual Peter Wilson Lecture • Royal Society of Edinburgh • February 25, 2016

Dame Anne Glover: 'Lost in Translation'

THE SCRR'S SHOWPIECE event, the annual Peter Wilson lecture, is to be given next year by Professor Dame LA Glover, former Professor of Molecular biology and Cell biology at the University of Aberdeen and now the same university's Vice Principal for External Affairs and Dean for Europe. Professor Glover served as Chief Scientific Adviser to the President of the European Commission from 2012 to 2014 and was made a dame in the 2015 Birthday Honours. She offers the following abstract of her lecture.

'The world of science is beguilingly simple as we construct hypotheses, test them and then make conclusions relevant to the evidence. This is a continuous process refined over time. Politicians also claim to want evidence to form the basis of their policies – but sometimes the evidence is not consistent with their philosophies, or is at odds with other considerations such as economic factors.

'How are we then to ensure that politicians and policymakers have access to the best possible advice when we know that the advice may not be taken? How do we deal with uncertainty in translating that advice to policymakers and should science advisers be in the business of providing policy options based on the available evidence?

'The lecture will draw on experience in providing science advice to government and administrations in Scotland and in Europe.'

Members' reports

Forest Research

Forest storm resilience improved with latest software

A new tool can help forest managers to assess the risk of wind damage to particular stands of trees

THE LATEST VERSION of the ForestGALES computer-based tool, released in October 2015 by Forest Research, will help forest managers protect their forests from the increasingly stormy conditions predicted as a result of the changing climate. It has been developed in close collaboration with researchers at Forest Research and INRA (Institut National de la Recherche Agronomique) in Bordeaux, France.

Using the latest science on wind risk, ForestGALES helps forest managers to estimate the probability of wind damage to a forest stand so they can adjust their forest management to reduce wind risk. In Britain, major storms have damaged over a million cubic metres of timber at least five times in the last 50 years, causing major economic losses.

The original ForestGALES was based on over 30 years of research exploring tree stability. This new edition incorporates the latest science from Forest Research about how trees respond to the extremes of wind stress they experience during storms (the 'gust factor'), and from a new analysis of the anchorage of almost 2000 trees across Britain. The new analysis has provided an improved understanding of how trees are anchored in relation to their rooting depth, and in soil groups with different physical properties.

Damage in Greskine forest, Dumfries and Galloway, caused by the storm of January 2012

ForestGALES 2.5 predicts most forest stands to be more stable than previous versions did, and the improved accuracy of its estimates have been verified based on damage to forests caused by a major storm that crossed Scotland in 2012. It also incorporates a 'research mode' that will allow researchers to examine the effects of changing the many physical characteristics of trees and forests.

For further information, please see www.forestry.gov.uk/fr/forestgales and www.forestry.gov.uk/fr/stability

Shared experiences of climate-ready forestry

A recent meeting at Queen Elizabeth Forest Park focused on practical ways to build resilience

OUR CLIMATE IS CHANGING and this is impacting on us in many different ways. In the forestry sector particularly noticeable have been extreme weather events which can bring high winds and heavy rainfall.

On October 6th, 2015 around 30 foresters, policymakers and researchers met at Queen Elizabeth Forest Park near Aberfoyle to discuss the actions the forestry sector is taking to make it more able to cope with our changing climate. The event was funded by ClimateXChange and hosted by Forest Research and Forestry Commission Scotland. It brought people together to share knowledge and experience about the management of forests for resilience and to enable them to better cope with wind risk, slope stability and flooding.

Waterproofs on: a day of higher than average rainfall in Aberfoyle

During the day site visits and group discussions were used to share learning about practical approaches to forest management for resilience and draw out successes, ongoing challenges and possible solutions. The event provided participants with ideas to try in practice and highlighted sources of support and information. Insights from practice will be used to inform policy-making and research to support climate ready forestry.

A range of information and guidance about climate-ready forestry, including videos and links to decision support tools, is available on the Forest Research website and the Forestry Commission Scotland site.

Forestry Commission Scotland: scotland.forestry.gov.uk/

PICTURE: NILFANION; ALISTAIR BAXTER; FORESTRY COMMISSION PICTURE LIBRARY; MARTYN BAKER; GALLOWAY PHOTOGRAPHIC COLLECTIVE

What future for our uplands?

Professor Davy McCracken, Head of the Hill & Mountain Research Centre at Scotland's Rural College, on why the integration of farming and forestry could provide a range of benefits to landowners and the environment

MORE THAN 70% OF SCOTLAND'S land area consists of hills and mountains or has vegetation with upland characteristics.

Land use varies markedly in the uplands: however, most uses have two things in common. They tend to concentrate on a single, large-scale form of 'production', such as farming, forestry, shooting sports, nature conservation; and those practising this use generally see the other systems as a 'threat' to their way of life.

Focusing on one income stream allows managers to concentrate efforts and develop expertise; however, this also leaves each enterprise vulnerable to external pressures and shocks. Extreme weather, for example, can kill livestock, damage trees and have major impacts on farm and forest productivity. Market pressures can also severely affect the economic viability of the enterprise.

SRUC's 2,200ha upland research farms at Kirkton and Auchtertyre near Crianlarich are typical of most Scottish upland farms because most is open moorland and the farm management is focused on sheep and cattle production. But it is atypical because over the past 15 years large areas of woodland have been planted.

'Land use tends to concentrate on a single, large-scale form of production, such as farming, forestry, shooting sports, nature conservation – and those practising this use generally see the others as a threat to their way of life'

Upland land users (clockwise from main picture): Highland cattle; dotterel; forestry; red deer; hillwalkers

Why? SRUC firmly believes that more integration of farming and forestry on Scottish upland farms could provide a range of benefits: to livestock production by increasing the amount of shelter available; and to the environment by, for example, providing habitat for other wildlife – and forestry may alleviate flooding downstream. Timber also provides another income stream. If designed carefully, integration could increase the resilience of upland farms to climatic and economic shocks.

The Hill & Mountain Research Centre was created 40 years ago to conduct research and demonstrate activities which may maintain the economic viability of Scotland's upland livestock farming.

SRUC encourages more open debate on the benefits from greater integration of forestry production into livestock farming systems in the uplands of Scotland.

For further information contact
davy.mccracken@sruc.ac.uk

Members' reports

The University of Edinburgh

Foodwise, a sustainable food dialogue project

Eugenia Jain, research associate in Low Carbon R&Dialogue, discusses Foodwise, a blog designed to promote dialogue about issues surrounding sustainable and healthy food

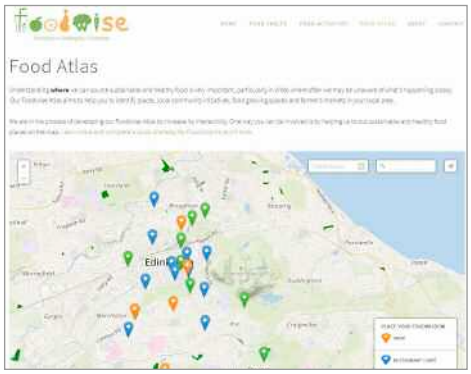
BACK IN OCTOBER 2014, researchers in the School of Geosciences at the University of Edinburgh organised an innovative 'design thinking' weekend workshop as part of the EU 'Low Carbon R&Dialogue' project (www.rndialogue.eu). The aim of the workshop was to bring together individuals from a variety of backgrounds to work collaboratively on finding practical tools to encourage more sustainable, low carbon behaviours.

One of the most exciting outputs from the workshop was 'Foodwise', a prototype for an online sustainable food platform. The website was designed to provide a space for people interested in sustainable food issues to share knowledge and practical advice and discover where to access healthy and sustainable food locally.

Over the past six months, Foodwise has evolved from a basic prototype made from paper and glue to an online reality. The website encourages a sustainable food dialogue through sharing real stories from people seeking to enjoy food in a more sustainable way.

As well as providing information on food news and events, the Foodwise Food Atlas is currently under development. The first phase of this interactive map, was launched in September, aims to help users in Edinburgh locate sustainable food in their local area.

The Atlas includes different layers of information for growing spaces, food retailers (for example, food co-ops, greengrocers, butchers, fishmongers, and bakeries), and dining out. It is fully interactive in that anyone can contribute to the map, and in the future comment on the content.



Above: vegetable stall at Royal Edinburgh Community Garden. Above right: 'Design Thinking' workshop. Left: the Foodwise online Food Atlas.

Foodwise Scotland, foodwise.scot or to learn more about the project, please contact Eugenia.Jain@ed.ac.uk

Wellcome Trust to invest a further £5 billion in health

Priorities for UK's leading charitable foundation include drug-resistant diseases and science education

THE WELLCOME TRUST aims to invest £5 billion over the next five years to improve health, as it launches a new strategic framework focussed on advancing the best ideas in science and research, seizing opportunities as they arise and taking advantage of their independence to drive reform.

This marks another step forward for Wellcome, the world's second highest spending charitable foundation, which has invested £6 billion over the last ten years and £11 billion since it began in 1936. Wellcome's new framework consists of three complementary approaches across science, research and engagement with society: Advancing ideas, Seizing opportunities, Driving reform.

The initial priorities include: drug-resistant infection; vaccination; Our Planet, Our Health; science education.

Details at www.wellcome.ac.uk/News/Media-office/Press-releases/2015/WTP059904.htm

PICTURE: WELLCOME TRUST

PICTURES: PETE HOLLINGSWORTH, RBGE; YIN LUN, CENTRE FOR BIODIVERSITY AND INDIGENOUS KNOWLEDGE

Expanding rubber plantations may threaten biodiversity and livelihoods

Antje Ahrends of the Royal Botanic Garden Edinburgh discusses a study of the environmental and economic risks of rubber plantation expansion

NATURAL RUBBER from the tree *Hevea brasiliensis* is the main source of rubber for high pressure applications: it is used in the production of more than a billion tyres per year. Rapidly increasing demand, mainly driven by the expanding Chinese car industry, has led to rampant expansion of rubber plantations all over South East Asia. A recent study at the Royal Botanic Garden Edinburgh has shown that this may threaten biodiversity and livelihoods.

In insular South East Asia, rubber is partly displaced by the even more lucrative but strictly tropical oil palm. This creates incentives for rubber farming in continental South East Asia where there is much less naturally suitable habitat. The vast majority of new rubber plantations have been established in novel environments, including those of high biodiversity value. In the last decade as much as 5,000 km2 of forests have been converted to monoculture rubber. And an estimated 57% of rubber plantations are now located in areas susceptible to drought, erosion, frost, or wind damage, which may make long-term rubber production economically unsustainable. In 2013, typhoons destroyed plantations worth over US$ 250 million in Vietnam alone, and future climate change is likely to exacerbate these environmental stresses. There is thus clear potential for loss-loss scenarios: clearing of high-biodiversity value land for economically unsustainable plantations that are poorly adapted to local conditions, and lead to environmental degradation such as altered landscape water balances, top-soil erosion and stream sedimentation. Ultimately this will also compromise livelihoods, particularly when rubber prices fall.

Increasing demand for natural rubber (top left) leads to pressure on habitats

Scots scientists address conservation challenges in Sarawak

A new initiative will look at how research can help refine forest management in this rich biodiversity hotspot

SCOTTISH-BASED SCIENTISTS are part of a vital vanguard in Sarawak, home to such creatures as the enigmatic orang-utan. At the signing of a five-way international Memorandum of Understanding (MOU) in the state capital, Kuching, tropical botanist Dr Peter Wilkie of the Royal Botanic Garden Edinburgh (RBGE) spoke of the importance of the multi-disciplinary approach that has been created thanks to the Malaysian state opening up its Totally Protected Areas (TPAs) to foreign researchers.

The richness of Sarawak's plant and animal life is internationally renowned. However, while Sarawak's landscape has changed rapidly with development in recent decades, our understanding of the impact of these changes – such as deforestation – has lagged behind. This new initiative will look at how research can help refine the management of Sarawak's forests, especially its biologically rich TPAs, in the interests of conservation.

Roadside plant identification in Sarawak, an area of high biodiversity

As part of the initiative, four field sites have been selected for an intensive research programme. These include the lowland and hill forests of Nanga Segrak and Nanga Bloh in Lanjak-Entimau Wildlife Sanctuary, and Nanga Delok in Bantang Ai National Park in the interior. All have fully developed, well-equipped, field stations. A fourth field station will be built in the newly gazetted Ulu Sebuyau National Park, located in one of Sarawak's most extensive areas of peatland and kerangas forests.

Provoked by the Sarawak Forestry Corporation (SFC), the project will be led by a group of eminent international and regional scientists with field experience in the state. They include Sarawak Forestry, RBGE, the Smithsonian Conservation Biology Institute, the Lee Kong Chian Museum of Natural History, Singapore and the Wildlife Conservation Society.

For more information please contact Shauna Hay, S.Hay@rbge.ac.uk

Members' reports

National Museums Scotland; Scottish Natural Heritage

Scottish fossils attract China's attention

Nick Fraser, National Museums Scotland, reports on a recent visit to Scotland by Chinese paleontologists

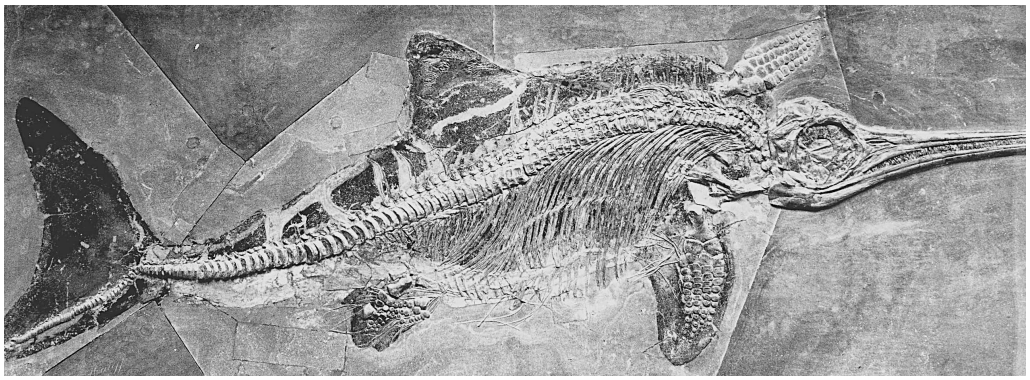
IN AUGUST 2015, National Museums Scotland welcomed Professors Li Chun and Xu Xing from the Institute of Vertebrate Palaeontology and Palaeoanthropology (IVPP) in Beijing. IVPP is an internationally renowned centre for fossil vertebrates and part of the Chinese Academy of Sciences. Xu Xing is the world's foremost authority on feathered dinosaurs and Li Chun is an expert on Triassic marine reptiles.

During their stay in Scotland they visited 'Willie's Hole', the remarkable fossil site near Chirnside that was excavated this summer. Here NMS palaeontologists worked together with scientists from the BGS and the universities of Southampton, Cambridge and Leicester to uncover the remarkable fossiliferous horizon that yields some of the earliest vertebrates to have ever lived on land. Because the sediments outcrop in the river bed it required a complicated damming procedure that Xu Xing and Li Chun found fascinating.

But undoubtedly the highlight of the trip was a three-day excursion to Skye to look at the Jurassic sediments that outcrop at various places on the island. We were joined on the trip by Tom Challands from Edinburgh University, Neil Clark from the Hunterian Museum, and Dugald Ross from Staffin Museum.

These Jurassic deposits have yielded both dinosaur remains and marine reptiles such as ichthyosaurs and are therefore of interest to both Xu and Li Chun. However, their Middle Jurassic constitutes an even greater interest since, apart from the Middle Jurassic dinosaurs of China, Skye is the only other place on earth currently known to yield dinosaur remains of similar age. So our Chinese colleagues were particularly excited to find some intriguing fossils including a small theropod dinosaur tooth.

For the next steps in this collaboration, together with Steve Brusatte of Edinburgh University we are now considering a joint Scotland-China research programme. We hope that jointly we shall be able investigate potential similarities between Scotland and China during a period in dinosaur evolution that largely still remains unknown.



Below: ichthyosaur fossil from Skye

PICTURE: UNIVERSITY OF GLASGOW

Scotland and China: proposed collaboration in habitat mapping

Ed Mackey of Scottish Natural Heritage describes a visit to Beijing to discuss shared experience of digital mapping

AN EXCITING OPPORTUNITY arose in August 2015 to speak on land mapping at a Royal Society of Edinburgh-National Natural Science Foundation of China Workshop on Sensors and Imaging Systems in Beijing, China.

Ed Mackey, Head of Knowledge and Information Management at SNH, gave the presentation on behalf of Scottish Government-SNH. This sharing of experience between Scotland and China will help strengthen expertise in habitat mapping, biodiversity assessment and natural capital accounting.

A presentation on land cover and biodiversity mapping in China, given by Dr Yuan Zeng, Associate Professor at the Chinese Academy of Sciences Institute of Remote Sensing and Digital Earth, was especially relevant and offered fascinating insights:

• As with the UK, the mapping of China for 1990 and 2000 was based on Landsat TM technology;

• A more recent 2010 map utilised the new Huan Jing environmental satellite constellation, similar in notable ways to the Sentinel environmental satellites being launched by the European Space Agency Earth Observation Programme, Copernicus;

• China has experience of managing very big data volumes;

• The spatial resolution of the 2010 map, at 250m, is comparable to and rather better than the 500m continental-scale resolution of the

The Great Wall of China, visited on the cultural tour – one of many highlights

Do rural and urban Scotland need each other?

Ellie Brodie, an SRUC Rural Policy Centre researcher, reports on a roundtable event organised by the Scottish Consortium for Rural Research (SCRR) and SRUC Rural Policy Centre

IN POLICY, THERE ARE 'place-less' approaches operating throughout Scotland, designed neither for 'urban' or 'rural'; there are also policies designed specifically for urban and rural places, as well as spaces in between. Researchers tend to focus on either rural or urban rather than look at interconnections between the two.

This event took place on June 30th 2015, and provided the chance for people from different backgrounds and sectors to discuss: (1) whether 'rural' and 'urban' Scotland exist as separate spaces and places in research and policy fields, or are they interdependent; (2) why this matters; and (3) what needs to change in research and in policy. The discussion will inform SRUC's two-yearly publication, Rural Scotland in Focus 2016.

There were 21 participants in attendance from policy, practice and research backgrounds. Each participant was asked to write a short 'think piece' reflecting on four questions and these were circulated prior to the event. Two suggested actions emerged in relation to policy and research. First, more evidence of appropriate rural development could be gathered and showcased so that policy recognises that rural Scotland is changing and indeed needs to change (i.e. grow). However, given the emphasis on rural areas as places for recreation and 'breathing space', this could be challenging and illustrates the potential conflict about appropriate types of development in rural areas.

PICTURE: KIM TRAYNOR

Rural meets urban: Bathgate, West Lothian

The Scottish Rural Parliament was suggested as a potential help to 'updating people's reality' in order to be ambitious for rural Scotland. Second, a suggestion was proposed that each policy issue should be 'stress tested' according to equalities and geography.

The full report on the event can be accessed at: www.sruc.ac.uk/info/120403/rpc_events/1537/2015_do_rural_and_urban_sc

Delegates at the RSE-NSFC Workshop at Beihang University, Beijing

European CORINE map;

• A EUNIS (European Union Nature Information System) land cover map published by SNH earlier in the year at 10m resolution is suited to use within country at the regional scale;

• Both China and Scotland have adopted international habitat classification standards: EUNIS in Scotland; the FAO Land Cover Classification System in China.

The strategic research priorities were expressed in the RSE-NSFC presentation in Beijing as follows:

• Tracking biodiversity from space – Sentinel 2 satellite;

• Wetland management from space – Sentinel 1 satellite;

• Habitat detection, discrimination, image segmentation, mapping;

• Habitat condition (productivity / stress) mapping;

• Change detection and alerts;

• Natural capital and carbon accounting;

• Assessing environmental risk.

With Dr Edward Mitchard, Chancellor's Fellow at the University of Edinburgh, as the academic lead for Scotland, SNH aims to submit an application with Dr Zeng to the RSE-NSFC Joint Project Scheme. This two-year exchange scheme, if approved, will address common research interests between Scotland and China, and will link well with the European Space Agency call for help in tracking biodiversity from space .

The RSE-NSFC joint programme is a remarkable opportunity to engage in international research collaboration at no administrative or financial cost, in this case to SNH or the Scottish Government.

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The deadline for copy in the next issue is January 8th, 2016

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Printed in Scotland on recycled paper (100% post-consumer waste) by The Jane Street Printing Company, Leith, Edinburgh.

Designed in East Lothian by mobo media