

Where innovation is right at home

Scotland's contribution to the UK's new agri-tech centres

Report by SRUC and Roslin Institute

2

The answer lies in the soil

Guidance for farmers and crofters on caring for a prime asset

Report by SRUC

4

Seaweed is now on the menu

Novel source of nutrition is about to be trialed in animal feed

Report by SAMS

7



Saving trees from pests and disease

How volunteers act as an early warning system to spot outbreaks

Report by Forest Research

7

scrr

Scottish Consortium
for Rural Research

formerly the Edinburgh Consortium for Rural Research

SCRR Newsletter
formerly The Bush Telegraph

Issue 86
Autumn 2016

www.scrr.ac.uk

PICTURE: NICCOLÒ CARANTI UNDER CC BY-NC 2.0



Brexit and rural research

Prof Stuart Monro, scientific director of SCRR, on the challenges brought by exit from the EU and the continuing importance of international collaboration

THE EXIT OF the UK from the European Union (EU) will bring big challenges for the rural research community. An undertaking has been made by the UK Chancellor that commitments made by the EU, by way of research grants and agricultural subsidies, where agreed before the UK Autumn Budget Statement, will be honoured by the Treasury until 2020. This gives a measure of comfort, at least in the short term.

We live in a world of 'big science' executed through international collaboration. A measure of the quality of rural research delivered in Scotland is the extent and effectiveness of our international collaborations, and the frequency with which we take on the roles of coordination and as principal investigators. A challenge to be faced

is in working towards safeguarding our leading role as research collaborators in the period post-Brexit. Figures from various sources confirm the disproportionately high level of success of the UK research community in securing competitive funding from EU sources (eg 17.2% of the total FP7 budget 2007 to 2013, second only to Germany at 17.7%) and of Scotland's research community within that.

Adapting to the changing context of the UK leaving the EU is a reminder of the continuing need to develop our collaborations around the world and broadening the sources of our funding. Collectively, the members of the SCRR are in leading positions to reiterate that rural research by Scottish teams is tackling global issues as well as those of Europe.

This issue in acronyms and abbreviations

CIEL is the new UK-wide centre for excellence in livestock – **page 2**

EID or 'electronic identification' is a super-fast way to measure and record farm animals – **page 2**

iSAGE is a multi-million-pound EU-funded project to secure the future of sheep and goats – **page 3**

CREW is the Centre of Expertise for Waters in Scotland, funded by the Scottish Government – **page 4**

IFOS is the Inventory, Forecasting and Operations Support wing of Forest Research – **page 5**

NFSD is the UK National Facility for Scientific Diving – **page 6**

APHA is the Animal and Plant Health Agency, a collaboration between DEFRA and the Welsh and Scottish governments – **page 7**

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

Scotland's Rural College • Roslin Institute • Moredun Research Institute

Agri-tech innovation centres take shape in Scotland

New projects at SRUC and Roslin are part of a UK Government initiative aimed at revolutionising agriculture

THREE OF FOUR new Agricultural Innovation Centres funded by the UK Government have strong representation in Scotland.

The centres have been launched with the aim of stimulating inward investment and revolutionising farming practices. The three with significant Scottish involvement are CIEL, which focuses on livestock; Agri-EPI, which looks at precision agriculture and engineering; and AgriMetrics, which studies the better use of big datasets with agriculturally related applications. The fourth centre, based largely in England, is the Centre for Crop Health and Protection (CHaP), which will work closely with the other three.

First to get properly established was AgriMetrics, launched in late 2015, with Scotland's Rural College (SRUC) as one of its founder members. SRUC will host a TV recording facility for training and knowledge transfer purposes, and will act as a data hub in Scotland for a cloud computing facility



that will hold, process, co-ordinate, model and apply extensive agricultural datasets such as meteorological data.

Smart technology in action: gathering data with a drone

CIEL, the Centre for Innovation Excellence in Livestock, will invest in a number of facilities north of the border including SRUC's Avian Research Unit, which will be relocated to state-of-the-art premises in Midlothian.

Transformational genetics capability will continue at the Roslin Institute with an investment of £10.5m in a large

animal research and imaging facility for metabolism and infectious and novel phenotyping of traits at whole animal level. CIEL's membership includes 12 academic institutions and more than 15 companies, including both global businesses and innovative SMEs.

Agri-EPI, the Agricultural Precision Engineering Innovation Centre, has too many members to list in this short article, but some key Scottish partners include Harbro, Mackies, NFUS Scotland, Strathclyde University and SRUC. It will build three main research and development sites in the UK, with one located at Easter Bush, and there will be approximately 30 satellite farms across the UK, used to demonstrate and test new technologies.

Professor Geoff Simm, SRUC's vice principal for research, views the centres as a UK-wide initiative, but one with strong representation and connectivity in Scotland which will contribute to the rural economy here and abroad.

Sustainable disease control using EID technology

David McBean and Fiona Kenyon of Moredun, and Claire Morgan-Davies of SRUC's Hill and Mountain Research Centre, report on a way to identify sheep vulnerable to parasite infestation

WITH LAMB PRODUCTION contributing an estimated £176 million to the Scottish economy in 2015, the long-term profitability of Scottish sheep farms is essential to the agricultural sector. A major threat to lamb production is the development of resistance to chemical wormers, which can lead to a total failure to control endemic parasite disease. Resistance develops with every drug treatment, and while the standard approach is to treat the whole flock, many lambs cope with infection without treatment, and it does little to improve productivity.

Scientists at Moredun have developed a means of identifying which individual lambs will benefit from



Above right: sheep being assessed by an EID system

treatment so that wormers can be targeted to where they will be most effective. Targeted Selective Treatment (TST) involves calculating the potential growth rate for a healthy lamb, then treating any that fail to meet the target. Untreated animals avoid concentrating resistance genes in the parasite population, instead diluting them by passing out susceptible parasites onto the pasture, reducing the spread of resistant genotypes.

In trials, this method has proved effective, reducing wormer use without

any production losses. Using Electronic Identification (EID) technology to rapidly identify and record production data as well as sort lambs into 'treat' and 'not' groups, TST is quick, simple and cost-effective. EID weighing is often used to rapidly sort lambs reaching marketable weight and TST can be incorporated with this. The equipment is expensive, but the cost savings, particularly in labour, should make it worthwhile.

For more, contact Dave McBean, Dave.McBean@moredun.ac.uk

BRIDGET MUASA and Aluna Chawala, PhD students at SRUC's Dairy Research and Innovation Centre on the outskirts of Dumfries, have just embarked on projects which aim to help dairy farmers back in their home countries of Kenya and Tanzania.

Bridget's and Aluna's projects, both of which are funded by the Bill and Melinda Gates Foundation, should both boost the dairy sector in Africa, in very different ways. Aluna will spend time with dairy farmers in Tanzania, with the aim of identifying the genetic traits needed to help breed for the ideal African dairy cow; while Bridget will focus on conception rates in east Africa.

Aluna will use techniques traditionally more associated with social anthropology and will talk with and observe African farmers to try to identify the key genetic traits required to help grow the dairy industry on a continent where farmers can make as little as a few pounds a day. His aim is to create practical breeding goals for African dairy farmers, so that their livestock is adapted for an African system, rather than a Western one.

Aluna explains his innovative approach: 'The problem with quick fire

Gates PhD students aim to improve the African dairy industry

Sarah Hunter-Argyle, acting head of communications at SRUC, describes novel projects that will apply UK expertise in Kenya and Tanzania



Aluna Chawala and Bridget Muasa

type surveys is that the farmers do not build up a relationship with the researcher and so they may not feel comfortable enough to be completely honest. Also survey questions may be interpreted differently by different

respondents, and so the results can be misleading.'

Bridget's research will focus on improving conception rates in east Africa, where farmers lack easy access to technologies that tell when animals are ready to conceive. Bridget will study tools currently in use in the UK before taking them to Kenya to see how they work in an African environment.

'I hope this research will identify practical tools the dairy farmers in east Africa can use, and that those tools will save them money result in a rise in conception rates,' Bridget says. 'I'm really interested to find out both how well the products work generally, and what differences we might see between the UK and African dairy sectors.'

For more contact Sarah Jane Hunter, Sarah.Glasgow@sruc.ac.uk

Sheep and goats for the future

SRUC is contributing to a multi-million pound, EU-funded research project aimed at future-proofing an industry

RESEARCHERS FROM Scotland's Rural College are contributing to iSAGE, a multi-million-pound, EU-funded research project aiming to future-proof our sheep and goat farming industry.

The iSAGE project has been awarded nearly £6 million by the EU's Horizon 2020 fund. It will assess the key factors that could impact the sector over the coming decades, such as climate change and consumer preferences.

SRUC and UK project partners – AHDB, the National Sheep Association and the Organic Research Centre – are part of a consortium involving 28 partners from across Europe. The focus for the SRUC team will be on creating practical breeding goals and tools for the sheep and goat sector in both Britain and Europe.

The project will look at how our climate and pastures might change, and how consumer and farmer attitudes and preferences could develop; and will then design



programmes which will ensure that animals can be bred that are best suited to those conditions.

It is predicted that in Scotland and the UK the climate could be milder and wetter. Additionally, sheep here are mainly bred for meat and wool, while in

southern Europe sheep milk and cheese is far more popular.

Professor Georgios Banos of SRUC says: 'Different countries and environments require different types of animals. If, for example, we do have more wet weather in the UK, we could see more parasites on our pastures which means grazing animals will need to have stronger resistance to diseases they carry.'

The first year of the project will assess the current position in terms of the sheep and goat farming sector across Europe then focus on mapping the potential changes in terms of weather, pastures, and the markets.

The project will run until 2020, when the researchers hope to be able to provide farmers across the UK and Europe with the genetic information needed to create sheep and goats best suited for the future.

For more information on the iSAGE project contact Sarah Jane Hunter, Sarah.Glasgow@sruc.ac.uk

Members' reports

Scotland's Rural College • Forest Research

Valuing your soils: new guidance for Scottish farmers, crofters and land managers is available online

A number of research organisations, including SRUC, are collaborating to produce better guidance for farmers on how to avoid the loss or degradation of one of their biggest assets

A NUMBER OF organisations within SCRR, along with other researchers and industry groups, have teamed up to create new guidance to help Scottish farmers, crofters and land managers protect and manage their most valuable resource; soil.

It can take 500 years to replace 25 mm (1in) of topsoil, yet in the UK it is estimated that 2.9 million tonnes of soil are eroded each year, and soil quality is diminished by poor practices.

Farmers are under increasing pressure from climatic events, like last winter's heavy rains, which had dramatic effects on farm businesses across Scotland. Poor drainage and waterlogged fields can encourage soil compaction problems, contributing to poor nutrient uptake by crops and reduced yields. Less obvious are issues associated with poorly drained grasslands which, for example, can encourage parasites leading to poor livestock nutrition and health.

The new guidance contains useful information about Scotland's agricultural soils and practical advice



outlining the upfront financial savings and business benefits of better soil management and the efficient use of resources.

Mark Aitken, Principal Policy Officer for the Scottish Environment Protection Agency (SEPA), who requested the production of this much needed practical advice, said: 'Protecting Scotland's soils and

environment is now more important than ever in the face of current economic, climatic and environmental challenges. The *Valuing Your Soils* brochure encourages good management practices that will improve soil quality, help maintain healthy soils and in turn improve farm profits and protect the environment.

'The publication is also immensely useful because it highlights the importance of good soil structure in protecting and improving water quality, and also helping to reduce flood risks.'

The booklet was funded by CREW (Centre of Expertise for Waters) at the request of SEPA with input from Scottish farmers, researchers and consultants from Scotland's Rural College and industry experts guided by a steering group including CREW, SEPA, industry levy body AHDB, NFUS, Scottish Water, SNH, QMS, Forestry Commission Scotland and the Scottish Government.



Above: the new publication on protecting soils

Electronic versions can be downloaded at www.sruc.ac.uk/info/120603/farming_and_water_scotland

Forest Research is growing

Strengthened staff teams in key areas will help the Forestry Commission's research arm in its vital work

FOREST RESEARCH is the research agency of the Forestry Commission and Great Britain's principal organisation for tree-related research, evidence and data. Our capabilities have recently grown with the addition of FCGB teams in inventory, forecasting and operations support (IFOS), publications and statistics. This has strengthened the skills and expertise that Forest Research is able to offer.

The IFOS team undertakes work related to the National Forest Inventory (NFI). The NFI involves collecting, synthesising and disseminating accurate information about the size, distribution, composition and condition of all forests and woodlands in the UK. The IFOS team also are skilled in



mapping and geodata and operational support, including the main forest management information system (Forester GIS). The publications team is responsible for the production of a

Above: FR's HQ

wide range of information (such as research notes and practice guides) as well as the revised UK Forestry Standard, due for publication in 2016. The statistics team produces official statistics related to forestry, including the annual Forestry Statistics and summary in Forestry Facts and Figures.

These skills will strengthen our ability to tackle key research programmes related to the science and evidence that protects our trees and forests; enhances forest ecosystem resilience and service provision; ensures sustainable management and adaptation of forests to climate change; and effects knowledge exchange.

For more on Forest Research see www.forestry.gov.uk/forestresearch

Sequencing genes of major barley pathogen is an important step towards better disease control

Scientists at Scotland's Rural College are collaborating in the fightback against ramularia, a fungal pathogen of barley that can reduce crop yields by up to a fifth

SCIENTISTS AT Scotland's Rural College, together with colleagues at the University of Edinburgh and Rothamsted Research, have unravelled the genome of ramularia, a fungal pathogen attacking barley crops that can reduce yields by up to a fifth.

Ramularia affects both yield and grain quality and was first noticed in Italy over 100 years ago. It is only within the last 30 years that the disease has become a significant problem for farmers growing a crop of major importance to the brewing, distilling and feed markets.

Dr Neil Havis, a member of SRUC's Crop and Soils team, believes this latest advance enables scientists to investigate why the pathogen behaves the way it does. For example, why does the *Ramularia collo-cygni* fungus attack barley with toxins only after it flowers or becomes stressed, just at a time when little can be done about it?

According to SRUC researcher Dr Graham McGrann, there are additional opportunities on the horizon.

Right: a field of barley in Italy, where the ramularia fungus first appeared



PICTURE: GREG CRICK VIA PIXABAY

Genome studies have shown that ramularia is closely related to septoria, the major fungal disease of wheat crops across the world. They are distinct organisms, but because of the relationship between the two fungi, work on a barley disease could also help wheat growers.

Researchers at SRUC are already using the knowledge of gene sequences to delve deeper into fungal behaviour.

For Neil Havis, a key issue is to understand what stimulated ramularia

to change from being a relatively unimportant pathogen to one which is now so harmful.

'Are there answers contained in what we now know about the genomes of both barley and ramularia that can help us? Was there something about our selection of barley varieties, or the changing climate, that suddenly made conditions so much better for the disease? If this breakthrough helps us address questions like this, farmers, brewers, distillers and consumers will benefit.'

Traditional forestry yield model goes digital

Forest Research's new software will make it quicker and easier for professional foresters to use this vital tool

YIELD MODELS ARE one of the foundations of forest management. They provide information about the patterns of tree growth and potential productivity that can be expected in forest stands of different tree species, with varying growth rates, when managed in different ways.

Making forest management decisions, forecasting production levels, making timber supply commitments, planning and scheduling forest operations, and demonstrating the sustainability of forest operations are all areas where yield models can help.

The outputs from yield models also support many other calculations and models. These include the modelling of timber and wood properties, the

estimation of forest biomass and carbon stocks, the modelling of forest greenhouse gas balances, and the economic evaluation of forestry policies and management options.

Forest Yield is a new PC-based version of the yield models which have been indispensable to professional foresters and forestry researchers in Great Britain for decades. This digital version provides new functionality to make it simpler and faster to use the models. Forest Yield will therefore be an



invaluable tool for a range of forest and woodland managers and practitioners, researchers and students.

Downloadable from the Forest Research website, the software provides the user with estimates of various aspects of tree growth for a wide range of tree species, yield classes and management prescriptions. The species are all grown in the British Isles.

The software and the accompanying user manual are supported by a handbook on forest growth and yield tables for those who want to know more about the theory underpinning yield modelling.

For further information and to order, see www.forestry.gov.uk/forestryield

Members' reports

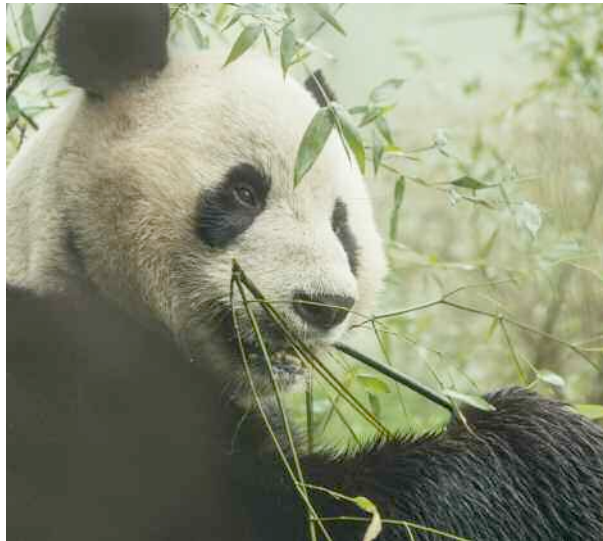
Royal Zoological Society Scotland • RBGE • Scottish Association for Marine Science

RZSS EDINBURGH ZOO'S giant pandas are providing scats for Royal Botanic Garden Edinburgh (RBGE) scientists who – with £250,000 Leverhulme Trust funding – aim to aid conservation through clarification of the animals' diet.

Pandas might eat up to 60 species of bamboo, which vary in nutritional value, digestibility and general acceptability, and also consume other plants, fungi and animals.

Observation of wild animals and visual examination of scats present a limited picture of species eaten. This is further complicated by difficulties distinguishing bamboo species, especially once digested. Therefore, RBGE is developing DNA-based methods for use in the wild by first receiving panda scats from zoos, where it is known what and how much animals have been fed.

Molecular ecologist Dr Linda Neaves explained: 'Next-generation sequencing technologies will be used to investigate the DNA and identify what has been eaten and by which panda, potentially overcoming past challenges that restricted our understanding and helping to quantify



DNA insights in panda diet investigations

Dr Iain Valentine of Royal Zoological Society Scotland describes a collaboration with Royal Botanic Garden Edinburgh

the extent of variation in diet and contributing factors such as sex, season and availability.

'Identification of bamboo species in panda habitat and how this relates to diet will also provide valuable information for population management and conservation'.

RZSS Director of Giant Pandas, Iain Valentine, added: 'RZSS is currently undertaking or facilitating a huge variety of giant panda conservation projects in Scotland, around the UK and globally; these will make substantial collective contributions to the future of the giant panda both in captivity and in the wild.'

The project is an Edinburgh Consortium for Giant Panda Conservation and Forest Landscape Restoration initiative. Other partners include Kunming Institute of Botany, the Institute of Zoology at the Chinese Academy of Science, China Conservation and Research Centre for Giant Pandas, Panda Centre within the Wolong Nature Reserve and Australian Museum Research Institute.

For details, contact Dr Iain Valentine, ivalentine@rzs.org.uk

Scuba divers enlisted to monitor ocean temperatures

SAMS is finding that 'citizen scientists' from the diving community can produce a wealth of useful data

RESEARCH CONDUCTED BY the Scottish Association for Marine Science (SAMS) and their collaborators shows that scuba-diving 'scientists' can help monitor ocean temperatures

The potential of scuba divers to provide vital information about the temperature of our oceans has been demonstrated for the first time using 'citizen science'. A study published in *Nature's* online journal *Scientific Reports* has shown that temperature profiles from scuba divers' computers can provide accurate records from locations across the globe that add to existing monitoring networks, helping us to better understand our marine environment.

The work, led by the Centre for Environment, Fisheries and Aquaculture Science (Cefas) in collaboration with the Scottish Association for Marine Science (SAMS), have used the Dive Into Science website to collect more than 7,600 temperature records from sport divers, building up a record of global sea temperature in the first project of



its kind. Co-author Dr Martin Sayer, who leads the Natural Environment Research Council's National Facility for Scientific Diving (NFS) based at SAMS, has conducted numerous studies on the performance of dive computers. He hopes that the results

Above: scientist diver collecting data for comparison studies

from this study will encourage manufacturers and customers to see the benefits of developing new dive computer models that not only support the diver, but also produce high-quality oceanographic data.

Temperature recordings were downloaded from decompression computers commonly worn by divers, but the accuracy of these records was unknown. Comparisons made between diving computers and scientific instruments, and also with satellite measurements of water temperature, showed that dive computers can provide accurate records.

Dr Kieran Hyder, who led the citizen science project, acknowledges that there is still some way to go before he achieves his ultimate vision of a global oceanographic resource, but added: 'The potential of scuba divers to contribute to ocean monitoring is huge and I believe that this study demonstrates only the tip of the iceberg.'

For more, see www.diveintoscience.org

Seaweed's potential as a supplement in animal feed

A project at the Scottish Association for Marine Science (SAMS) is targeting a sustainable source of nutrition



Left: SAMS support scientist Lars Brunner collects a sample of seaweed from the shore at Dunstaffnage, near Oban



Above: seaweed is hauled from SAMS' seaweed farm site in northern Argyll

Dr Michele Stanley, who is leading the project for SAMS, said: 'Our work with seaweed covers a variety of applications, from food to biofuels, and I am delighted that Davidson Bros and Interface have recognised the potential of this work. Grants that support

research/industry projects such as FeedMe encourage innovation and allow both parties to find mutually beneficial solutions.'

Gary Dow of Davidsons Animal Feeds said: 'Our aim has always been to provide our customers with value for money products that are high performance in their use for livestock production. By collaborating with experts from SAMS we hope to introduce a new, sustainable feedstock into our

ingredients while maintaining the quality and high nutritional values our customers expect.'

Interface Food and Drink is funded by the Scottish Funding Council and was set up with the aim of promoting partnerships between businesses and academics to drive innovation through knowledge exchange, collaboration and funding.

A GRANT OF around £50,000 from Interface Food and Drink's legacy competition has funded a collaborative project known as 'FeedMe' between SAMS and Davidson Brothers (Shotts) Limited.

Research will focus on the viability of an innovative pre-treatment process of seaweeds to produce a nutritional and sustainable supplement for feed

products; biomass is a by-product. Helen Pratt, Project Manager at Interface Food and Drink, said: 'Working together, business and academics can push ahead with really ground-breaking innovations which enhance the sustainability of the businesses in all senses of the word, and help the evolution of the dream of a circular economy into reality.'

Observatree project: online resources now available

An update on this project led by Forest Research to gain an early warning of dangerous pests and diseases

THE AIM OF the Observatree project is to protect the UK's trees, woods and forests from new pests and diseases – either arriving, or spreading across the country. The earlier they are spotted, the higher are the chances that outbreaks can be eliminated or controlled. The project is focusing on a list of pest and diseases that are of the highest concern.

A wide range of resources and training materials are now available on the Observatree website, to help improve knowledge of our priority pests and diseases. These will be added to throughout the project. Tree health professionals and people

actively involved with trees are encouraged to act as citizen scientists and report potential sightings of anything worrying. More eyes on the ground means a greater chance of earlier detection. Concerns should be submitted in the first instance to Tree Alert (see below).

Funded by the EU's LIFE programme, Observatree is a partnership led by Forest Research, the research agency of the Forestry Commission. Project partners are Fera Science Ltd, Forestry Commission (GB and countries), the National Trust and the Woodland Trust. Supporting the project are the Animal



Above: checking for disease in woodland

and Plant Health Agency (APHA), the Department for Environment, Food and Rural Affairs (Defra) and Natural Resources Wales.

See observatree.org.uk/resources and [Tree Alert at forestry.gov.uk/treelert](http://forestry.gov.uk/treelert)

SCRR member organisations

The University of Edinburgh	www.ed.ac.uk
Moray House School of Education.	www.ed.ac.uk/schools-departments/education
Royal (Dick) School of Veterinary Studies	www.ed.ac.uk/schools-departments/vet
School of Biological Sciences	www.ed.ac.uk/schools-departments/biology
School of Engineering	www.see.ed.ac.uk
School of GeoSciences	www.ed.ac.uk/schools-departments/geosciences
School of History, Classics and Archaeology	www.shca.ed.ac.uk/Research/
School of Social and Political Studies	www.sps.ed.ac.uk
Biomathematics and Statistics Scotland.	www.bioss.ac.uk
British Geological Survey, Edinburgh	www.bgs.ac.uk
Centre for Ecology & Hydrology, Edinburgh.	www.ceh.ac.uk
Crichton Carbon Centre	www.carboncentre.org
Field Studies Council, Millport	enquiries.sco@field-studies-council.org
Forest Research, Northern Research Station.	www.forestry.gov.uk/forestresearch
Heriot Watt University, School of Life Sciences	www.sls.hw.ac.uk
James Hutton Institute	www.hutton.ac.uk
Moredun Research Institute	www.moredun.ac.uk
Napier University, School of Life, Sport & Social Sciences	www.napier.ac.uk/fhlss/SLSSS
National Museums of Scotland	www.nms.ac.uk
Roslin Institute, University of Edinburgh.	www.roslin.ed.ac.uk
Royal Botanic Garden Edinburgh	www.rbge.org.uk
Royal Society for the Protection of Birds - Scotland	www.rspb.org.uk/scotland
Royal Zoological Society of Scotland	www.rzss.org.uk
Science & Advice for Scottish Agriculture	www.sasa.gov.uk
Scotland's Rural College (formerly Scottish Agricultural College)	www.sruc.ac.uk
Scottish Association for Marine Science, Oban	www.sams.ac.uk
Scottish Natural Heritage	www.snh.gov.uk
SNIFFER	www.sniffer.org.uk
Society, Religion and Technology Project	www.srtp.org.uk
University of Glasgow	www.gla.ac.uk
College of Medical, Veterinary and Life Sciences	www.gla.ac.uk/colleges/mvls/
College of Social Sciences	www.gla.ac.uk/colleges/socialsciences/
University of the Highlands and Islands (UHI)	www.uhi.ac.uk
Agronomy Institute, Orkney College	www.agronomy.uhi.ac.uk
Centre for Mountain Studies, Perth College	www.perth.uhi.ac.uk/specialistcentres/cms
Centre for Remote and Rural Studies, Inverness College	www.crrs.uhi.ac.uk
Environmental Research Institute, North Highland College	www.eri.ac.uk
Lews Castle College, Stornoway	www.lews.uhi.ac.uk/research
NAFC Marine Centre, Shetland	www.nafc.ac.uk
West Highland College, Fort William	www.whc.uhi.ac.uk
University of Stirling	www.stir.ac.uk
Institute of Aquaculture.	www.aquaculture.stir.ac.uk
Biological & Environmental Sciences	www.stir.ac.uk/natural-sciences/about-us/bes/

Events

www.scrr.ac.uk/events

Please see the website for announcements.

PEOPLE AT SCRR

Scientific Director:
Prof Stuart Monro
Stuart.Monro@blueyonder.co.uk

Secretary/Treasurer:
Prof Willie Donachie
willie.donachie@moredun.org.uk

CONTACT SCRR

SCRR, 18 Hoghill Court, East Calder,
West Lothian EH53 0QA

01506 880929 or 07990 595217

COPY DEADLINE

The deadline for copy in the next issue is December 12th, 2016

DISTRIBUTION

For all queries about distribution, please contact the Secretary/ Treasurer by email.

FUTURE ISSUES

Contributions to the SCRR newsletter are welcomed. All contributions, comments and suggestions should be emailed to the Secretary/Treasurer as above.

ON THE WEB

Back issues: www.scrr.ac.uk/newsletters

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](http://mobo.media)