

Bush Telegraph

The House Magazine of the Edinburgh Consortium for Rural Research

MESSAGE FROM ATHENS – AND BATTLEBY



A lunch break at the ECRR-sponsored biodiversity workshop at SNH Battleby Centre, Perth on 13 May 2009

A high-level biodiversity conference, organised by the European Commission in Athens at the end of April 2009, acknowledged that the EU will fail to halt the decline in biodiversity by 2010, a target set by governments back in 2001. However the conference did set out proposals to reinvigorate the mission under the banner "Message from Athens". These include:

- Promoting better understanding that healthy ecosystems deliver tangible benefits underpinning our economic, social and cultural well-being.
- Providing better information on the state of biodiversity, current trends in biodiversity, and how natural systems work. The conference recommended that biodiversity research should be made a higher priority.
- We need to look for the "triple win" of biodiversity that can actively contribute to climate mitigation and adaptation.

A much more modest and focused event took place in the lovely setting of SNH's Battleby Centre near Perth two weeks later on 13th May 2009. The aim of this one-day ECRR-sponsored forum was to review Scotland's rural biodiversity and to explore successes and failures in achieving biodiversity goals, how these goals could be integrated into key policies, and how diverse partners can work together to achieve biodiversity and other goals.

A few of the key points in the "Message from Perth" included:

- The merits of the ecosystem services approach which tries to value the contribution of biodiversity to human well-being.
- Amongst the Scottish public an increasing number of people who both care about diversity and who are taking action in support of their beliefs.
- Highlighting the leadership role that UK individuals and NGOs have played in promoting biodiversity in Europe.
- The need to change the way that CAP support is targeted towards a scheme where the onus is on all farmers to achieve a minimum level of habitat biodiversity.

"Nature can directly benefit the economy. In Scotland, for example, nearly as many people are employed in natural heritage activities as are employed in biotechnology, call centres and electronics combined".

European Commission President Jose Manuel Barros, speaking at a biodiversity conference in Athens 28 April 2009

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Thanks are due to Professor Martin Price and his colleagues at Perth College along with the staff at SNH Battleby for organizing and hosting a very successful forum.

Abstracts of the papers presented at the forum can be viewed at www.ecrr.org.uk.

The lively discussions taking place inside the auditorium amongst the 100-plus delegates were much encouraged outside by a fine display of some 19 poster presentations on a wide range of biodiversity topics.

Heriot Watt University



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FOCUS ON THE FUTURE

As part of Heriot-Watt University's new institutional strategy 'Focus on the Future' launched at the end of 2008, five topical themes are being developed. These are:

- Energy;
- Infrastructure & Transport;
- Risk & Modelling;
- Life Sciences Interfaces; and
- Environment & Climate Change.

The Environment & Climate Change Theme has the broadest remit, has overlaps with the other Themes and involves nearly all the Schools and Institutes within Heriot-Watt University. On the teaching front, there is already a programme of MSc courses up and running which involve teaching from across the University and are based around two core modules: Climate Change: Causes and Impacts in Semester 1, and Climate Change: Mitigation and Adaptation measures which runs in Semester 2. There are two further specialist courses contributed by participating Schools entitled Applied Mathematical Sciences with Climate Change Impacts Modelling and Climate Change: Managing the Marine Environment. The main cross-School course is Climate Change: Impacts and Mitigation and here students have a broad range of over 20 relevant elective modules to choose from offered by the different Schools of the University.

The main aim of the University's strategic themes is to encourage inter-disciplinary research across the School structure of the University and to integrate also with Research Pooling initiatives. Theme Teams



Heriot-Watt University staff and students are collaborating with researchers at the Smithsonian Tropical Research Institute, Panama to study the marine and coastal Conservation Area of Las Perlas Archipelago - on of the activities under the "Environment & Climate Change" Theme.

are working closely together to identify the many calls now being announced by joint Research Councils and government departments, a good example of which is the Living With Environmental Change programme. All the Themes are actively recruiting and the Environment & Climate Change Theme is looking to appoint a Chair in 'Biodiversity' and a Chair in 'Green Consumer Behaviour' in this first year of the Focus on the Future Strategy.

There are two other developments in which the members of the Theme are currently actively involved:

- 1) The newly approved Research Pooling initiative of MASTS (Marine Alliance for Science and Technology Scotland) in which Heriot-Watt staff members are heavily involved in the Joint Research areas of 'Biodiversity and Ecosystem Function' and 'Platforms and Sensors'.

- 2) The collaboration with the University of Edinburgh on the development of 'The Climate Change Centre'.

It is an interesting and challenging time for Universities in the present economic climate but the 'real' climate and the resulting environment changes certainly need as much research and understanding as possible if the appropriate actions and policies are to be developed.

For further details of the Focus on the Future Themes, the MASTS pooling initiative and international biodiversity researches please refer to:

<http://www.hw.ac.uk/focusonthefuture/>

<http://www.postgraduate.hw.ac.uk/academic-life/climate-change-programme.htm>

<http://mss.st-andrews.ac.uk/index.html>

http://striweb.si.edu/darwin_initiative/index.html

The Roslin Institute, University of Edinburgh



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MOREDUN SCIENTIST APPOINTED HONORARY PROFESSOR



Professor Gary Entrican

Gary Entrican of Moredun Research Institute has been appointed as an Honorary Professor associated with The Roslin Institute. This honour is conferred only upon individuals of high academic distinction who hold leading roles in organisations with which the University has a close working relationship.

Professor Entrican is the leader of the Moredun Research Institute's Immunology theme the research remit for which is "To study the mechanisms underlying immune and inflammatory responses of ruminants to infectious agents of immunological, comparative medical and veterinary interest."

Gary obtained his BSc Honours and PhD in Immunology at the University of Glasgow before moving to Edinburgh to take up a three-year post-doctoral position at the Moredun Research Institute, studying

immune responses to viral infection in sheep. At the end of the project he took up a Core Research position at Moredun, focussing on immune regulation and cytokine biology in sheep with specific reference to chlamydial abortion, a disease that causes major losses in sheep flocks across the UK. His work has led to several commercial products, diagnostic tests for diseases of sheep and cattle, and is being expanded through competitive grant acquisition, most of which are with colleagues at University of Edinburgh.

PRIZE WINNER

The Knowledge Transfer Partnership (KTP) Centres in Scotland prize for Best Project Presentation has been won by Dr Almas Gheyas for her work on the Marker-Assisted Selection of salmon carried out for Landcatch Natural Selection (LNS) Ltd. and The Roslin Institute of the University of Edinburgh.

Dr Gheyas is currently in the third year of a project at LNS, Alloa, where she has been working on the successful application

of Marker-Assisted Selection for resistance to the viral disease, Infectious Pancreatic Necrosis (IPN). This project has seen the first commercial application of Marker-Assisted Selection in Aquaculture.

"This is cutting-edge technology which is enabling us to continue advancing our salmon breeding, greatly improving the health and welfare of farmed fish around the world," said Hugh Currie, LNS Chairman. "The contribution which Dr Gheyas has made to the success of this work is invaluable to LNS. We're delighted therefore that her work, especially her ability to communicate the science behind the improvements we're making, has been recognised in this way by KTP."

Dr Almas Gheyas joined LNS in January 2007. While remaining an employee of The Roslin Institute, she is seconded full-time to LNS working exclusively on the Marker-Assisted Selection project, which is jointly funded by LNS & KTP. She holds a PhD from the University of Stirling. Born in Bangladesh, she also has a BSc and MSc in Fisheries at Bangladesh Agricultural University.



Dr Alma Gheyas receiving her award

Royal Botanic Garden Edinburgh



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NEW SCOTTISH PLANT HOUSE OPENS

The Scottish Plant House at the Royal Botanic Garden Edinburgh (RBGE) was officially opened on March 11 by Colin Galbraith, Director of Scientific and Advisory Services, Scottish Natural Heritage.

Among many of Scotland's threatened plant species being nurtured within the Garden's newest plant house is the Catacol Whitebeam tree, *Sorbus pseudomeinichii*. This species is native to Glen Catacol near Lochranza on the north-west of Arran, but there is only one remaining in the wild. It is the rarest tree in Scotland and is among the most endangered tree species in the world. Only one tiny sapling has germinated from seed and it is being nursed and coaxed to maturity by staff at RBGE.

A method called chip budding is being used to grow more Catacol Whitebeam and also two other species of Whitebeam from Arran; *Sorbus pseudofennica* and *Sorbus arranensis*. Buds from all three Arran Whitebeam species have been grafted onto young rowan trees. The grafted shoots are then enclosed in compost to encourage them to root. Once this is accomplished they will be cut free from their hosts.

The Scottish Plant House is the result of collaboration with Scottish Natural Heritage, which in 2007 launched the Species Action Framework to monitor and identify 23 Scottish plants, animal and fungi species that are vulnerable or endangered by climate change or changing land use. Work on three out of the 5 plant species is being undertaken at the Scottish Plant House, alongside 106 other Scottish species already under cultivation.



Pseudomein seedling

Professor Mary Gibby, RBGE's Director of Science, explained that while the aim is to re-establish populations into sites where a plant was formerly known to grow, a back-up collection will be retained to insure against total loss in the wild.

The Scottish Plant House meets the requirements of the Target 8 Project led by PlantNetwork giving horticultural support for conservation of the flora of Britain and Ireland. Target 8 of the Global Strategy for Plant Conservation (GSPC) aims for 60 per cent of threatened plant species in ex situ collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes.

DELIGHT & SURPRISE

Logan Botanic Garden in Dumfries & Galloway has named two new, entirely home-grown rhododendron cultivars. *Rhododendron edgeworthii* 'Logan Delight' and 'Logan Surprise', both recently registered with the Royal Horticultural Society, are the products of hand-pollination by a staff member, David Knott, in the 1980s. David is now Curator at Edinburgh.

COMING TO FRUITION

On Thursday 21 May, Richard Lochhead, Cabinet Secretary for Rural Affairs and the Environment, officiated at the topping-out ceremony of the John Hope Gateway visitor centre at Inverleith.

The ceremony marked the completion of the construction phase of the project. Mr Lochhead, said: "It is wonderful to see the John Hope Gateway Visitor Centre so close to completion and the Scottish Government's £10 million investment coming to fruition."

The Gateway will open to the public later this summer, offering visitor facilities, interpretation, an improved shop, a new restaurant as well as temporary and permanent exhibition spaces.

UHI Millennium Institute – Centre for Mountain Studies



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UNESCO CHAIR

Professor Martin Price, Director of the Centre for Mountain Studies (CMS) at Perth College UHI, has been appointed Chairholder of the UNESCO Chair in Sustainable Mountain Development at UHI Millennium Institute. This is the first UNESCO Chair in Scotland, established in March 2009, and one of 12 in the UK. The UNESCO Chairs Programme was established in 1992, as a way to advance research, training and programme development in higher education by building university networks and encouraging inter-university cooperation through transfer of knowledge across borders.

There are over 600 UNESCO Chairs worldwide, undertaking training, research, information-sharing and outreach activities in UNESCO major programme areas (education, natural sciences, social and human sciences, culture, and communication and information). They provide an innovative framework for international academic cooperation and capacity building, acting as think tanks and as bridge builders between research and policy-making, and between academia and civil society.

This UNESCO Chair recognises that mountains cover 24% of the Earth's land surface, and that 26% of the global population lives in and around mountains, which provide vital goods and services to more than half of humankind. The Chair will contribute to sustainable mountain development, which concerns both mountain regions and populations living downstream or otherwise dependent on these regions in various ways.



Professor Martin Price

Objectives

There are three project objectives. The first is to facilitate further development and implementation of the Global Change in Mountain Regions (GLOCHAMORE) Research Strategy, which was developed through a two-year project supported by the European Commission's 6th Framework Programme, and concluded with an international conference with 210 participants from 41 countries, organised by the CMS in Perth in October 2005.

The second is to organise and contribute to international meetings that facilitate understanding of, and action towards, sustainable mountain development, taking global change into consideration; and publish the outcomes; in particular, the CMS will organise an international conference on global change and mountain regions in Perth in September 2010.

The third is to foster and support the development and delivery of Masters-level courses that support sustainable mountain development. This builds particularly on

the experience of developing and, since 2004, delivering an on-line part-time MSc in Managing Sustainable Mountain Development. In this context, Martin Price attended the 3rd annual meeting of the Himalayan University Consortium, a network of academic and research institutions from the eight Himalayan countries, in Dehra Dun, India in February. This has led to the UHI becoming an associate member of the consortium, to be involved in the development of a framework for education on sustainable mountain development in the Himalayas. At a later date, the Chair will be involved in the development of comparable courses in Latin America.

UNESCO & the Chairs Programme

The United Nations Educational, Scientific and Cultural Organization (UNESCO) is a UN Specialized Agency which contributes to peace and security by promoting collaboration among nations through education, culture, sciences, and communication.

The UNITWIN/UNESCO Chairs Programme advances research, training and programme development in higher education by building university networks and encouraging inter-university cooperation through transfer of knowledge across borders. The 600 UNESCO Chairs and 60 UNITWIN Networks of today involve over 740 institutions in 125 countries.

For more details: see www.unesco.org.uk/UNITWIN_UNESCO_Chairs.htm

The Centre for Mountain Studies (CMS)

The Centre for Mountain Studies (CMS) was established at Perth College UHI in August 2000 with a focus on mountain environments and the people who depend on them, both in Scotland and internationally.

Scottish Agricultural College



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NEW BEEF RESEARCH CENTRE

Over 300 visitors attended the official opening on 28th January 2009 of SAC's new Beef Research Facility at Easter Howgate on Bush Estate

Costing over £1m, with funding from the Scottish Government, the facility is designed to provide a generation of researchers the flexibility to carry out a range of projects

from simple beef feeding trials to the complexities of carbon footprinting.

SAC Principal and Chief Executive Professor Bill McKelvey said, "This puts SAC in a pre-eminent position, with the largest facility of its kind in Britain. Beef research has been underfunded for some time so this is a significant statement and represents a huge vote of confidence by the Scottish Government in the beef industry."

Richard Lochhead MSP, Cabinet Secretary for Rural Affairs and the Environment, explained how delighted he was to see the state-of-the-art facility in place. "It will provide ongoing support to and contribute to the ongoing success of our first class Scottish beef industry," he said.

He went on to praise SAC's emphasis on communicating the significance and relevance of its work as entirely appropriate and something that, in its backing for Knowledge Exchange activities, the Scottish Government recognised as important. "By its very nature science generates new knowledge and stimulates innovation that are exactly what is required to enable the beef sector to remain competitive in this rapidly changing world."

Richard Lochhead expressed his commitment to the livestock sector in Scotland. He stressed that 85% of the landmass is best suited to livestock grazing and, as that was unlikely to change, the long tradition of livestock farming was set to continue.



The opening of the Easter Howgate Beef Research Centre

SCOTTISH RESEARCH IN EUROPE

"If research co-ordination is important at national level, then it is vital at European and international level. That is why I want to wish SAC well in deepening their European relationships further".

Scotland's new Culture, External Affairs and Constitution Minister, Mike Russell, MSP, was speaking to an invited audience in Brussels at a reception organised by SAC for MEP's, European Commission officials and opinion formers. It was part of SAC's two-day programme in Brussels aimed at deepening working relationships with a range of EU bodies.

"The research work that SAC and other Scottish research institutions do is vital to informing the decisions the Scottish Government takes," said Mike Russell. "That is why we invest around £70 million a year to support the science base".

The SAC delegation, which includes SAC Chief Executive Bill McKelvey, Head of SAC Research John Oldham and Assistant Principal George Marshall, met with

officials from DG Sanco, the EU Department responsible for Health and Consumer Affairs. They discussed animal disease and welfare issues and the contribution SAC expertise could make to a proposed new EU centre for animal welfare.

John Bensted Smith, Director of Economic Analysis and Policy Perspectives in DG Agri, highlighted the importance the Commission places on the impact assessments and evaluation of policy. Research capacity in this field is scarce and SAC's experience was welcomed, as was SAC expertise in KT. EU officials are as anxious as those in Scottish Government for the public to know more about the value they get for their taxes.

It was clear that concentrating many minds in Brussels is the future of rural Europe beyond 2013 which offers scope for work which can help forecast the future of rural development as well as economic and social policies. It appears there are as many questions being asked in Europe about what works and what doesn't with the Rural Development Programme as there are in Scotland and officials were interested in SAC evaluation strategies.

Discussions on the food supply chain covered trade regulations, quotas and economic analysis with particular interest in SAC's research record into analysing market forces and food price changes and market models. It is clear that food is now of strategic interest across the EU.

At DG Sanco the delegation met with Alberto Laddomada, the Head of Unit, (Animal health and Standing Committees), as well as other senior officials with an interest in animal welfare and importation. Discussion focused on how welfare can improve livelihoods, whether it is a cost or a value and SAC work in these areas. With plans for a proposed EU Welfare Centre, the officials were interested to hear SAC views and the contribution that could be made to the planning process.

The final sessions on Tuesday were with DG Research where climate change, an issue that had interested every group, was discussed at length. It is apparent that the EU is responding slowly to the research needs of climate change and work on livestock emissions in particular. The Commission will



Lord Jamie Lindsay, Chairman of the SAC Board, Mike Russell, MSP Scottish Government Minister for Culture, External Affairs and the Constitution, and Professor Bill McKelvey, at the SAC reception in Brussels.

Moredun Research Institute



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ROYAL VISIT

HRH The Princess Royal praised the efforts of scientists at the Moredun Research Institute in March for their efforts to safeguard animal health through developing new and improved vaccines.

The event, which was attended by over 100 invited guests, showcased the work Moredun is conducting in vaccine development for livestock in order to prevent animal suffering and improve animal health and welfare, both nationally and internationally.

HRH The Princess Royal, as Patron of the Moredun Foundation (the governing body of the Moredun Research Institute), is a regular visitor to Moredun's base at Pentlands Science Park, Penicuik and enjoys being updated with its work in animal health. Her Royal Highness has stated in previous visits to Moredun that "the Foundation's commitment to improving animal health and welfare by reducing the burden of animal disease is probably the greatest gift man may offer the animal kingdom."

Moredun is internationally known for its work on the infectious diseases of livestock and is committed to developing new and improved vaccines and diagnostic tests in order to prevent animal disease. This event promoted some of the vaccine development work being undertaken by Moredun Research Institute scientists, as well as highlighting the success Moredun has in commercialising its research and turning potential animal health products into reality through its commercial company Moredun Scientific.

Professor Julie Fitzpatrick, Chief Executive of the Moredun Foundation commented: "Moredun is dedicated to minimising animal suffering by preventing and controlling



HRH The Princess Royal is introduced to some of the Moredun Scientists trying to develop new and improved livestock vaccines

livestock disease. The development of new and improved vaccines is therefore a key part of our work and we are delighted to have the continued support of our Patron".

Juan Escala, Managing Director of Moredun Scientific agreed: "There are a number of successful livestock vaccines currently on the market which were developed from initial research carried out at Moredun. Today's event illustrated the importance of the ongoing research programmes at the Institute in continuing to combat diseases of livestock."

The event also highlighted the work of GALVmed (Global Alliance for Livestock Veterinary Medicines), a charity based at Pentlands Science Park with close links with Moredun which is working to develop and register veterinary vaccines and medicines in the developing world. During the visit HRH The Princess Royal met two Maasai warriors from Tanzania who were visiting Scotland in a project co-ordinated by GALVmed to learn more about modern farming methods and share experiences.



HRH The Princess Royal chats to Maasai warriors from Tanzania who are currently visiting Scotland to learn more about our livestock management

MRC Human Reproductive Sciences Unit



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MAKING A MALE

My group has been interested for more than 10 years in the origins of the commonest reproductive disorders that affect newborn (cryptorchidism, hypospadias) and young adult human males (low sperm counts, testicular germ cell cancer). Our interest has been fired by: (1) the remarkably high incidence of these disorders and evidence that some may be increasing in incidence, and (2) the inter-relatedness of the disorders and the evidence for a common origin in fetal life. The latter led to the hypothesis that these disorders may represent a syndrome – 'testicular dysgenesis syndrome' (TDS), the central tenet of which was that abnormalities of fetal testis formation/development would affect function of the somatic cells of the fetal testis and increase the risk of downstream disorders. Attractive though this hypothesis is, there are major difficulties in testing it. How do you prove connections between events in very early fetal life and adult-onset disorders 20–40 years later, and more importantly how do you identify causes and mechanisms?

Our approach has been to develop and validate an animal model which involves fetal exposure to a ubiquitous environmental chemical (dibutyl phthalate, DBP) and which induces a TDS-like syndrome in the male offspring¹. Consistent with the TDS hypothesis, DBP exposure dose-dependently induces focal dysgenesis of the testis, subnormal somatic cell function (especially of the fetal Leydig cells), altered fetal germ cell development, cryptorchidism, hypospadias and poor spermatogenesis/infertility in adulthood². Arguably the most important effect is the DBP-induced reduction in testosterone production by the Leydig cells as it is this androgen that is responsible for body-wide masculinisation, including of the

brain and genitalia. At the molecular level, we and others have established some of the pathways via which these effects occur, though the initial 'event(s)' still remains elusive. Although from reading this summary you may be thinking what a lovely model, we have reached the stage of realizing its limitations, and a major factor that led to this was also a discovery that fundamentally advanced our understanding about TDS – and this did not come from the rat DBP model but rather from an unrelated project that was trying to identify the molecular mechanisms via which androgens induce stabilization and development of the Wolffian duct in males, from which the epididymis, vas deferens and seminal vesicles develop.

In essence, what this project showed was that the key time for androgen action to develop the Wolffian duct was not at the time of its differentiation, but several days earlier³. In showing this we also found that exactly the same time window applied to penis development and to testis descent into the scrotum. Thus, although these various events occur at different times they are all 'programmed' by androgen action just after the testis differentiates. Realising the importance of this finding, we went on to show that cryptorchidism and hypospadias could only be induced by deficient androgen action within this 'male programming window'; hence, these two TDS disorders could only arise because of events at a specific time in fetal development³. More recently we have shown that androgen action within the 'male programming window' determines testis size in adulthood (testis size equates to the level of sperm production and sperm counts in man), demonstrating a clear potential link to an adult-onset TDS disorder⁴. However, the finding that will probably get the biggest press coverage is that the size and length of the penis is also determined by androgen action within the 'male programming window' (MS about to be submitted). So, although androgen action in late gestation, early postnatal life and at puberty is important for growing the penis (in rats and humans), it is androgen action within the

'male programming window' that determines ultimate size; deficient androgen action in this window 'dose-dependently' reduces adult penis length. Based on our rat studies, there is nothing (involving androgens) that can be done to increase penis size beyond the length determined by androgen action within the 'male programming window', so even more reason to disbelieve all of those e-mail messages you receive!

So how does this new understanding apply to our rat DBP model? In fact it has helped us uncover an important limitation, because although in this model there is suppression of fetal testosterone production, this suppression is most marked after the 'male programming window' rather than during it⁴, which explains why the incidence of hypospadias in this model is low (~12%, and mainly mild cases). So, we are currently exploring ways of improving our model.

Our rat studies have provided new insight and understanding into the origins of TDS disorders and have identified a time window in humans (probably 8–12 weeks' gestation) when such disorders may originate³. Exciting as this may be, the response from clinicians is 'so how does this help me identify or manage patients with TDS disorders?' Not a lot, is the honest answer – although there is one additional finding to have emerged from our studies with the 'male programming window' that does have potential clinical applications. It is anogenital distance (AGD). In humans, as in rats, AGD is ~1.7 times longer on average in males than in females and this difference is also programmed by androgen action within the 'male programming window'. After birth it provides a lifelong 'read-out' of androgen action at this time. More importantly, it is highly correlated with penis length, testis size, prostate size, cryptorchidism and hypospadias and can even 'predict' the severity of the latter two abnormalities. As AGD measurement is non-invasive (if highly embarrassing in a man!), it can provide information that may help us further resolve the relationships between human male reproductive disorders and androgen action

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early in gestation in the fetus. Based on our rat studies, AGD at birth should be able to predict adult testis and prostate size and penis length.

Our findings on the 'male programming window' highlight the different timing between androgen masculinisation of the body and that of the brain, because the latter is programmed by androgen action late in gestation, independent of body masculinisation, providing a rational explanation for how 'gender dysphoria' might arise. At the more general level, our studies pose questions about variability in androgen action within the 'male programming window' and later phenotype – we are not talking about clinically under-masculinised males, but subtle differences ('normal variation') in the masculine phenotype. In this regard, we want to identify what lifestyle or environmental factors (including DBP!) might impact on the mother at the time of the 'male programming window' and affect this process – with consequences for her son. Some big questions, for which we currently have no good answers, but at least we now know when to look.

- 1 Fisher JS, Macpherson S, Marchetti N, Sharpe RM (2003) Human 'testicular dysgenesis syndrome': a possible model based on in utero exposure of the rat to dibutyl phthalate. *Human Reproduction* 18: 1383-1394
- 2 Sharpe RM, Skakkebaek NE (2008) Testicular dysgenesis syndrome: mechanistic insights and potential new downstream effects. *Fertility & Sterility* 89 Suppl 1: e33-e38
- 3 Welsh M, Saunders PTK, Fisker M, Scott HM, Hutchison GR, Smith LB, Sharpe RM (2008) Identification in rats of a programming window for reproductive tract masculinization, disruption of which leads to hypospadias and cryptorchidism *Journal of Clinical Investigation* 118: 1479-1490
- 4 Scott HM, Hutchison GR, Jobling MS, McKinnell C, Drake AJ, Sharpe RM (2008) Relationship between androgen action in the 'male programming window', fetal Sertoli cell number and adult testis size in the rat. *Endocrinology* 149: 5280-5287

In Brief. . .

LINKING HEMISPHERES

SAC and collaborators AgResearch in New Zealand are planning an innovative joint conference in September using video links. The conference will debate the future of agriculture, rural businesses and communities in New Zealand and Scotland and explore the lessons learned from sometimes different experiences.

At a time when the future of agricultural and rural policy within the EU is coming under greater scrutiny, this conference will consider the sorts of innovation in agriculture that will help meet the challenges.

In addition, it will look at the important cultural changes that are shaping the way the public consumes food and understands agriculture. The future of rural areas also depends on non agricultural issues, including the trade-off between increasing food production and enhancing the environment.

Both SAC and AgResearch believe the conference will lead to the sharing of information about the policy and market challenges impacting on agriculture and the rural economies of Scotland and New Zealand.

ANIMAL BYTES

The British Society of Animal Science (BSAS) is providing a free online magazine about animal science. 'Animal Bytes' aims to make science much more accessible to farmers and advisors by delivering six editions per year of topical, relevant and up-to-date research findings that will assist farmers in their business and management practices. See www.bsas.org.uk.

IMAGES FROM THE BATTLEBY BIODIVERSITY WORKSHOP



SAC's Davy McCracken explains the finer details of farmland biodiversity



RSPB's Jeremy Wilson has SAC's John Oldham's full attention



A panel of speakers tackle a question from the floor.

ECRR DIARY 2009

Jun 8	Directors' Lunch	R(D)SVS, Edinburgh University Directors' Lunch	12.30
Jun 26	Executive Committee	SASA, Gogar, Edinburgh EH12	11.00
Sep 3	Executive Committee	Venue TBA	11.00
	Directors' Lunch	BGS, King's Buildings, Edinburgh	12.30
Oct 5	Directors' Lunch	SNIFFER, Greenside Place, Edinburgh	12.30
Nov 11	Directors' Lunch	Venue TBA	12.30
	Main Board		14.00
Dec 7	Executive Committee	Venue TBA	11.00
	Directors' Lunch	RBGE, Edinburgh	12.30

INTEGRATED AGRICULTURAL SYSTEMS CONFERENCE

The conference "Integrated Agricultural Systems: Methodologies, Modelling and Measuring" will be held on 2-4 June 2009 at SAC, Edinburgh. This conference is jointly organised by the Association of Applied Biologists, The British Society for Animal Science and the Agricultural Economics Society. The aim of this conference is to explore and identify effective methodologies for analysing integrated systems. This event will focus on north-west European conditions and interactions involving livestock.

Sessions include:

- Multi-functionality of land use
- Analysis across-scales
- Carbon Management
- Integrated Assessment
- Tools for analysing farm-scale systems
- Public Goods from farming systems and contrasting farming systems.

For more information see <http://www.aab.org.uk/>

THE CHANGING NATURE OF SCOTLAND

17th – 18th September 2009 – Perth Concert Hall, Mill Street, Perth

Purpose: The SNH 2009 conference will take stock of changes to our natural environment. Together, with the public and our partners within the rural and environment agencies, we will probe the reasons for change, what needs to be done to make things better and why this matters to Scotland and its people.

Content: Keynote talks will place Scotland's nature and the wider environment in an international context and review drivers of change – notably climate, land use, social issues and the economy.

More information: <http://www.snh.org.uk/conference2009>

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Centre for Ecology & Hydrology Edinburgh	www.ceh.ac.uk
MRC Human Reproductive Sciences Unit	www.hrsu.mrc.ac.uk
National Museums of Scotland	www.nms.ac.uk
Royal Botanic Garden Edinburgh	www.rbge.org.uk
Royal Society for the Protection of Birds – Scotland	www.rspb.org.uk
Scottish Agricultural Science Agency	www.sasa.gov.uk
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FUTURE ISSUES

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