



President: Professor Peter Shewry BA, BSc, PhD, DSc



Breeding Plants to Cope with Future Climate Change



**PROGRAMME , ABSTRACTS &
DELEGATE LIST**



Breeding Plants to Cope with Future Climate Change

University of Leeds

16-18 June 2014

The conference will cover the following topics:

- To discuss the contribution of plant science and breeding to maintaining food security in the face of increasing demand and the challenges presented by climate change
- To examine the role that basic plant science and modelling can play in supporting plant breeding to achieve yield gains and the goal of sustainable agricultural production
- To bring together world leading plant scientists, plant breeders, crop modellers and climate modellers to discuss the plasticity of the plant genome and its regulation in relation to climate change
- To consider how to balance the requirements of intensive agricultural production with the dependence of rural welfare on agricultural productivity, particularly in Africa
- The programme will include:
 - Improving photosynthesis to enhance yield
 - Genome plasticity in relation to biotic and abiotic stress responses
 - Pathways to innovation
 - Targeting climate information for crop breeding

PROGRAMME

(20 BASIS points have been awarded as follows: 8 CP, 8 E, 4 PD)

MONDAY 16 JUNE 2014

08:00 **CONFERENCE REGISTRATION & COFFEE** (Parkinson Building Concourse)
The Conference is to be held in the Great Hall, Parkinson Building

Morning Session: New ways to improve yield

Chairs: CHRISTINE FOYER (University of Leeds, Leeds, UK) &
NIGEL HALFORD (Rothamsted Research, Harpenden, UK)

08:50 **WELCOME & INTRODUCTION**
CHRISTINE FOYER (University of Leeds, Leeds, UK)

09:00 ***Invited Speaker***
Are Crop Plants Too Green?
DON ORT (University of Illinois, Urbana, USA)

09:45 ***Invited Speaker***
Exploiting useful genetic diversity in wheat landraces for adaptation to drought and heat stress
MARTA DA SILVA LOPES (CIMMYT, Ankara, Turkey), IBRAHIM SALAH,
STEPHEN BAEZINGER (University of Nebraska, Lincoln, USA) &
TOM PAYNE (CIMMYT, Mexico DF, Mexico)

10:30 **COFFEE** (Parkinson Building Concourse)

11:00 **Trehalose 6-phosphate, a sugar for all seasons, integrates source: sink balance for crop yield improvement**
MATHEW PAUL (Rothamsted Research, Harpenden, UK)

11:30 **Testing for N requirements in variety trials**
SARAH KENDALL (ADAS, Gleadthorpe, Mansfield, UK),
DANIEL KINDRED & ROGER SYLVESTER-BRADLEY (ADAS, Boxworth, Cambridge, UK)

12:00 **ATM and ATR DNA damage checkpoints control seed and seedling quality**
WANDA M WATERWORTH & CHRIS E WEST (University of Leeds, Leeds, UK)

12:30 **WRAP UP DISCUSSION**

13:00 **LUNCH** (Parkinson Building Concourse)

Afternoon Session: Crop production in the face of climate change

Chairs: CHRISTINE FOYER (University of Leeds, Leeds, UK) &
NIGEL HALFORD (Rothamsted Research, Harpenden, UK)

14:15 **Invited Speaker**
Adapting wheat to uncertain future
MIKHAIL SEMENOV & PIERRE STRATONOVITCH (Rothamsted Research, Harpenden, UK)

14:45 **Invited Speaker**
System Analysis of Physiological Traits Determining Grain Yield and Protein Concentration for Wheat as Influenced by Climate and Nitrogen Supply
PIERRE MARTRE, JIANQIANG HE (INRA, Clermont-Ferrand, France; Blaise Pascal University, Aubière, France), PIERRE STRATONOVITCH (Rothamsted Research, Harpenden, UK), VINCENT ALLARD, JACQUES LE GOUIS (INRA, Clermont-Ferrand, France; Blaise Pascal University, Aubière, France), & MIKHAIL A SEMENOV (Rothamsted Research, Harpenden, UK)

15:30 **TEA** (Parkinson Building Concourse)

16:15 **Invited Speaker**
Synthetic approaches to improving photosynthesis'
CHRISTINE RAINES (University of Essex, Colchester, UK)

17:00 **Understanding wheat yield improvements to equip breeders for the future**
SARAH CLARKE (ADAS Gleadthorpe, Mansfield, UK) & ROGER SYLVESTER-BRADLEY (ADAS Boxworth, Cambridge, UK)

17:30 **Optimising wheat flowering time for a changing climate**
ALISON R BENTLEY, RICHARD HORSNELL, PHIL HOWELL, NICK GOSMAN, RHIAN HOWELLS, GEMMA ROSE, TOBIAS BARBER, JAMES COCKRAM, ANDY GREENLAND & IAN J MACKAY (The John Bingham Laboratory, NIAB, Cambridge, UK)

18:00 **WRAP UP DISCUSSION**

18:15 **POSTERS & DRINKS RECEPTION** (Parkinson Building Concourse)

**The effect of planting date on growth and yield of chickpea crop
(*Cicer arietinum* L.) under future climate scenarios**

M T MUBVUMA (Great Zimbabwe University, Masvingo, Zimbabwe), J B O OGOLA (University of Venda, Thohoyandou, South Africa) & T MHIZHA (University of Zimbabwe, Mt Pleasant, Zimbabwe)

Towards a genotypic adaptation strategy in Indian groundnut using: an ensemble approach

JULIAN RAMIREZ-VILLEGAS (University of Leeds, Leeds, UK; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS); International Center for Tropical Agriculture (CIAT), Cali, Colombia) & ANDREW J CHALLINOR (University of Leeds, Leeds, UK; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS))

DNA repair kinetics and their roles in orthodox seed vigour and longevity

AARON J BARRETT, WANDA M WATERWORTH & CHRISTOPHER E WEST (University of Leeds, Leeds, UK)

The structure and mechanism of aluminium-resistance proteins in plants

TONY PALMER, STEVE BALDWIN, ALISON BAKER & STEPHEN MUENCH (University of Leeds, Leeds, UK)

Investigating SPX domain-containing proteins as a means of enhancing plant phosphate use efficiency

WANJUN QI, STEPHEN A BALDWIN, STEPHEN P MUENCH & ALISON BAKER (University of Leeds, Leeds, UK)

Scaling up to the canopy: using 3d structural data to empirically quantify the effects of photoinhibition on long term canopy carbon gain

ALEXANDRA BURGESS, RENATA RETKUTE, MICHAEL POUND & ERIK MURCHIE (University of Nottingham, Sutton Bonington, UK)

Exploiting wheat alien introgressions for increased photosynthetic productivity in contrasting environmental conditions

KANNAN CHINNATHAMBI, IAN KING, JULIE KING, JOHN FOULKES, MARTIN BROADLEY & ERIK MURCHIE (University of Nottingham, Sutton Bonington, UK)

Mutagenesis of barley to cope with rising atmospheric CO₂

JAVIER CORDOBA (IRNASA-CSIC, Salamanca, Spain; IRTA, Lleida, Spain), PILAR PEREZ, ROSA MORCUENDE, RAFAEL MARTINEZ-CARRASCO (IRNASA-CSIC, Salamanca, Spain) & JOSE LUIS MOLINA-CANO (IRTA, Lleida, Spain)

Improving rice photosynthesis in suboptimal conditions

TIARA HERMAN (University of Nottingham, Sutton Bonington, UK)

Plant hormone signaling in response to microbial compounds

HASIMAH ALIMON (Universidad de Salamanca, Salamanca, Spain), MARTA MARTÍNEZ, ANTONIO FERNÁNDEZ (Biomar Microbial Technologies, Parque Tecnológico de León, Armunia-León, Spain), DOLORES RODRIGUEZ & OSCAR LORENZO (Universidad de Salamanca, Salamanca, Spain)

A phylogenetic approach to aid the identification of plasmodesmata localized Glycosyl hydrolases

ROCIO GAUDIOSO-PEDRAZA & YOSELIN BENITEZ-ALFONSO (University of Leeds, Leeds, UK)

The Plant Science TREE – A teaching tool for plant science educators

AURORA LEVESLEY, CELIA KNIGHT, STEVE PAXTON and ALISON BAKER (University of Leeds, Leeds, UK)

The effects of ectopic phytoalexin expression on dark chilling stress tolerance in soybean (*Glycine max*)

JAMES COOPER (University of Leeds, Leeds, UK)

Nitrogen deficiency responses in 14 day old barley seedlings

GLORIA COMADIRA (University of Leeds, Leeds, UK)

The B subunit composition of protein phosphatase 2A regulates aphid resistance in *Arabidopsis thaliana*

BRWA RASOOL (University of Leeds, Leeds, UK)

The redox state of the nuclei and cytosol in the embryonic roots of germinating *Arabidopsis thaliana* seeds

AMBRA DE SIMONE (University of Leeds, Leeds, UK)

Climate-proofing maternal and child nutrition in Malawi using iron and zinc biofortified beans

VERONICA GUWELA, EDNA CURLEY, MARIJKE HUMMEL (University of Ireland Galway, Galway, Ireland; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)), GALINA BRYCHKOVA¹, UNA MURRAY (University of Ireland Galway, Galway, Ireland), ROBIN BURUCHARA, ROWLAND CHIRWA (International Center for Tropical Agriculture (CIAT), Lilongwe, Malawi; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)) & CHARLES SPILLANE (University of Ireland Galway, Galway, Ireland; CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS))

19:30 **DINNER** (Great Woodhouse Room, University House)

After Dinner Speaker

How close are we to acceptance of GM foods in Europe?

NIGEL HALFORD (Rothamsted Research, Harpenden, UK)

TUESDAY 17 JUNE 2014 (Great Hall, Parkinson Building)

08:00 **CONFERENCE REGISTRATION** (Parkinson Building Concourse)

Morning Session: Genome Plasticity in Relation to Biotic and Abiotic Stress Responses

Chairs: ROBERT EDWARDS (University of Newcastle, Newcastle, UK) & ALISON BAKER (University of Leeds, Leeds, UK)

08:30 **WELCOME & INTRODUCTION**

Moving from Plant Protection to Crop Health

ROBERT EDWARDS (University of Newcastle, Newcastle, UK)

09:00 ***Invited Speaker***

Waterproofing plants

JULIA BAILEY SERES (University of California, California, USA)

09:45 ***Invited Speaker***

Regulatory pathways that control plant freezing tolerance

MICHAEL THOMASHOW (Michigan State University, Michigan, USA)

10:30 **COFFEE** (Parkinson Building Concourse)

11:00 **Invited Speaker**

Enhancing epigenetic diversity in plants

PETER MEYER (University of Leeds, Leeds, UK)

11:45 **Quantitative analysis of lateral root morphogenesis**

ALEXIS MAIZEL (University of Heidelberg, Heidelberg, Germany)

12:30 **Phenotyping potato roots; identifying ideotypes for water stressed conditions**

JANE WISHART (University of St Andrews, Fife, UK) TIMOTHY S GEORGE, LAWRIE K BROWN, PHILIP J WHITE, GAVIN RAMSAY (The James Hutton Institute, Dundee, UK), HAMLYN JONES (University of Dundee, Dundee, UK) and PETER J GREGORY (East Malling Research, Kent, UK)

13:00 **WRAP UP DISCUSSION**

13:15 **LUNCH** (Parkinson Building Concourse)

Afternoon Session: Responses of crops to climate change

Chairs: ROBERT EDWARDS (University of Newcastle, Newcastle, UK) & ALISON BAKER (University of Leeds, Leeds, UK)

14:00 **Invited Speaker**

Designing new cereal cultivars using crop simulation modelling

REIMUND RÖTTER, TAO FULU (MTT, Plant Production Research, Mikkeli, Finland), JUKKA G HÖHN (MTT Agrifood Research Finland, Vihti, Finland) & TARU PALOSUO (MTT, Plant Production Research, Mikkeli, Finland)

14:30 **Invited Speaker**

Predicted and observed multi-decadal changes in climate, with particular reference to precipitation and crop demand for water

GRAHAM FARQUHAR, FUBAO SUN & MICHAEL RODERICK (The Australian National University, Canberra, Australia)

15:15 **TEA** (Parkinson Building Concourse)

15:45 **Developing genetic mapping resources from landrace-derived genotypes that differ for photoperiod sensitivity in Bambara groundnut (*Vigna subterranea* L.)**

PRESIDOR KENDABIE (University of Nottingham, Sutton Bonington, UK), FESTO MASSAWE (University of Nottingham Malaysia Campus, Semenyih, Malaysia) & SEAN MAYES (University of Nottingham, Sutton Bonington, UK; Crops for the Future Research Centre, Semenyih, Malaysia)

16:05 **Pre-emptive crop breeding strategies to mitigate impacts from emergent, evolved virulence and new-entry pests**

JULIAN SMITH (Food and Environment Research Agency, York, UK), FEN BEED (International Institute of Tropical Agriculture, Dar as Salam, Tanzania), DEBORAH HEMMING (Met Office, Exeter, UK) & JÜRGEN KROSCHER (International Potato Centre, Lima, Peru)

16:25 **Identification of early maturing maize hybrids with combined tolerance to multiple stress in West Africa**

ELOHOR BEATRICE IFIE (West Africa Centre for Crop Improvement, University of Ghana, Ghana; International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria), BAFFOUR BADU-APRAKU (International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria), VERNON GRACEN (Cornell University, Ithaca, NY, USA) & ERIC DANQUAH (West Africa Centre for Crop Improvement, University of Ghana, Ghana)

16:45 **Breeding for the ability to acclimate to water deficit: physiological mechanisms behind priming for stress**

DIANE ROWLAND, BARRY TILLMAN (University of Florida, Florida, USA), WILSON FAIRCLOTH (Syngenta, Leesburg, Georgia, USA), PAXTON PAYTON (USDA-ARS, Texas, USA), DAVID TISSUE (University of Western Sydney, New South Wales, Australia), BERTHA NGUKU, CHRISTOPHER VINCENT, BRUCE SCHAFFER (University of Florida, Florida, USA), & SETH BYRD (University of Georgia, Georgia, USA)

17:15 **Increasing the contribution that underutilised crops could make to food security – Bambara groundnut as an example**

SEAN MAYES (Crops for the Future Research Centre, Selangor, Malaysia; University of Nottingham Malaysia Campus (UNMC), Selangor, Malaysia), PRESIDOR KENDABIE (Crops for the Future Research Centre, Selangor, Malaysia; University of Nottingham, Sutton Bonington, UK), WAI KUAN HO (University of Nottingham, Sutton Bonington, UK; University of Nottingham Malaysia Campus (UNMC), Selangor, Malaysia), FESTO MASSAWE (University of Nottingham Malaysia Campus (UNMC), Selangor, Malaysia) & SAYED AZAM-ALI (Crops for the Future Research Centre, Selangor, Malaysia)

17:45 **Diversity for adversity: new cropping options**

EDWARD DICKIN (Harper Adams University, Newport, UK)

18:15 **POSTERS & DRINKS RECEPTION** (Parkinson Building Concourse)

19:30 **DINNER** (Great Woodhouse Room, University House)

After Dinner Speaker

What would you say to Ban Ki-moon at the Climate Summit in September?

DAVID HOWLETT (Climate Change and Livelihoods Adviser, DFID, Glasgow, UK)

WEDNESDAY 18 JUNE 2014 (Great Hall, Parkinson Building)

8:30 **CONFERENCE REGISTRATION** (Parkinson Building Concourse)

Morning Session I: Pathways to Innovation

Chairs: BRYAN D MCKERSIE (Independent Consultant, Raleigh, NC, USA) & PAUL KNOX (University of Leeds, Leeds, UK)

08:45 **WELCOME & INTRODUCTION**

Can Plant Biotechnology Provide Food Security in a Changing Climate?

BRYAN D MCKERSIE (Independent Consultant, Raleigh, NC, USA)

09:10 *Invited Speaker*

Crop Efficiency trait research at Bayer CropScience

MATTHEW HANNAH (Bayer CropScience, Gent, Belgium)

09:50 *Invited Speaker*

Expression of *Arabidopsis thaliana* HB17 gene in corn leads to improved sink potential

PAUL LOIDA (Monsanto, Missouri, USA)

10:30 **COFFEE** (Parkinson Building Concourse)

Morning Session II: Breeding Plants to Cope with Climate Change

Chairs: BRYAN D MCKERSIE (Independent Consultant, Raleigh, NC, USA) & PAUL KNOX (University of Leeds, Leeds, UK)

10:45 **Invited Speaker**

Genomics and breeding wheat for low-yielding environments

PETER LANGRIDGE (The University of Adelaide, Adelaide, Australia)

11:25 **Breeding for the future: How to adapt to potential impacts of future frost, drought and heat events on Australian wheat?**

KARINE CHENU (The University of Queensland, Queensland, Australia), BANGYOU ZHENG & SCOTT CHAPMAN (CSIRO, Queensland, Australia)

11:50 **Invited Speaker**

Improving barley culm robustness for secured crop yield in a changing climate

CHRISTOPH DOCKTER (Carlsberg Laboratory, Copenhagen, Denmark)

12:20 **Building partnerships with African institutions to address food insecurity in an unpredictable climate**

IRENE TAMAJONG, ROSITA YOCGO & THIERRY ZOMAHOUN (African Institute for Mathematical Sciences – Next Einstein Initiative (AIMS-NEI), Claremont, South Africa)

12:45 **WRAP UP DISCUSSION**

13:00 **LUNCH** (Parkinson Building Concourse)

Afternoon Session: Climate change models and their applications: Targeting climate information for crop breeding

Chairs: ANDY CHALLINOR (University of Leeds, Leeds, UK) & ANN KOEHLER (University of Leeds, Leeds, UK)

14:00 **Climate change and crops: a view from the IPCC**

ANDY CHALLINOR (University of Leeds, Leeds, UK)

14:30 **Climate model analysis for plant breeding**

ANN KOEHLER (University of Leeds, Leeds, UK)

15:00 **TEA** (Parkinson Building Concourse)

15:30 **Using climate information and crop modeling for crop breeding**

SENTHOLD ASSENG (University of Florida, Florida, USA)

16:00 **Breeding maize for climate change**

JILL CAIRNS (CIMMYT, Harare, Zimbabwe)

16:30 **Environmental Groups for Upland Rice Target Population Environments in Brazil: Drought Profile and Yield Trend**

ALEXANDRE BRYAN HEINEMANN (EMBRAPA, Santo Antônio de Goiás, Brazil)

Organised by Africa College, MACSUR CropM and CCAFS

17:00 **WRAP UP DISCUSSION**



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**



AAB FORWARD CONFERENCE PROGRAMME

2014

- 16-18 June **Breeding Plants to Cope with Future Climate Change**
University of Leeds (Multidisciplinary/University of Leeds)
- 19-20 June **Agronomic decision making in an uncertain climate**
University of Leeds (CATE Group)
- 9-12 September **5th International Symposium of Biofumigation**
Harper Adams University, Newport, Shropshire, UK
(HAU/Nematology Group)
- 11 September **Association of Applied Biologists AGM
(members and their guests only)**
Harper Adams University, Newport, Shropshire, UK
- 28-29 October **Workshop - Developments in hand-held application techniques**
School of Agriculture, Universitat Politècnica De Catalunya, Barcelona, Spain, (Pesticide Application Group)
- 19-20 November **Advances in Biological Control & IPM**
Olde Barn Hotel, Marston, Lincs (Biocontrol & IPM Group)
- 25-26 November **Crop Production in Southern Britain - Precision Decisions for Profitable Cropping**
Peterborough Arena, Peterborough (CATE Group/AICC, AIC, BCPC)
- 9-10 December **Challenges for Crop Production & Quality -
Annals of Applied Biology Centenary Conference**
Rothamsted Research, Harpenden, UK (Multidisciplinary, *Annals* Board of Editors)
- 16 December **Advances in Nematology**
Linnean Society of London, Piccadilly, London (Nematology Group)

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