

ASSOCIATION OF APPLIED BIOLOGISTS

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



**A two day conference
at Rothamsted Research, Harpenden, Herts, UK
on 9-10 December 2014
PROGRAMME AND BOOKING FORM**

**Challenges for Crop Production &
Quality -
Annals of Applied Biology
Centenary Conference**

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Challenges for Crop Production & Quality:

Annals of Applied Biology Centenary conference

on 9-10 December 2014

at Rothamsted Research, Harpenden, Herts, UK

It is fitting in marking the *Annals* Centenary to review how science has contributed to agriculture over the last 100 years and to consider future directions in the context of the challenges ahead. This international conference will focus on one of the greatest challenges facing applied biologists in the 21st century: the “Challenges for Crop Production and Quality”; meeting the requirements of an increasing global population, against the background of a changing climate, limiting resources and increased awareness of the environmental footprint. Agriculture faces serious challenges in the next four decades: resources such as water, land, soil, energy and nutrients are limited but production needs to increase to meet rising demand in a world where climate change is occurring. Demand for agricultural produce is currently at unprecedented levels due to increasing population and consumption *per capita*. It is estimated that in the next 40 years we will have to produce as much food as in the previous 8000 years. Sustainable agricultural systems are needed to minimise environmental footprint while maintaining food security. Will the Malthusian scenario occur or will necessity prove to be the mother of invention?

The first green revolution involved crop cultivars that gave good yield responses when supplied with fertilisers, irrigated and protected with pesticides. The challenge ahead is to develop crops and agronomic systems that will give good yields with fewer inputs which would improve the eco-efficiency of agriculture. The conference will address the appliance of science to address the grand challenge agriculture faces under four themes:

1. Maximizing Yield Potential;
2. Protecting Crop Potential (biotic and abiotic stresses);
3. Agriculture and the Environment;
4. Diet and health.

PROVISIONAL PROGRAMME

(BASIS points have been applied for)

Tuesday 9 December

08:30 CONFERENCE REGISTRATION & COFFEE

09:20 INTRODUCTION

PROF. JARI VALKONEN (Editor-in-Chief for *Annals of Applied Biology*)
(University of Helsinki, Finland)

Session I : Inaugural Presentations

09:30 *Invited Speaker*

The sustainable intensification of European crop production: illusion or balancing act?

PROF. IAN CRUTE CBE (Director, Agriculture and Horticulture Development Board, Stoneleigh Park, Warwickshire, UK)

10:10 *Invited Speaker*

Agriculture in the post-2015 sustainable development agenda

PROF. ACHIM DOBERMANN (Director, Rothamsted Research, Harpenden, Herts, UK)

10:50 COFFEE

Session II : Maximising Yield Potential

11:20 *Invited Speaker*

Maximising Yield Potential in the Face of Global Atmospheric Change

PROF. STEPHEN LONG FRS (University of Illinois, Champagne, IL, USA)

12:00 **Improving the efficiency of photosynthesis for increasing crop yields**

PROF. CHRISTINE RAINES (School of Biological Sciences, University of Essex, Colchester, UK)

12:40 **Mapping a route towards enhanced crop productivity in the UK**

PROF. ROGER SYLVESTER-BRADLEY, DANIEL KINDRED (ADAS Boxworth, Cambridge, UK), PETE BERRY, NEIL PAVELEY (ADAS High Mowthorpe, Malton, N Yorks, UK) & BRIAN CHAMBERS (ADAS Gleadthorpe, Notts, UK)

13:00 DISCUSSION

13:20 LUNCH & POSTERS

14:20 *Invited Speaker*

Sustainably achieving 20 20 Wheat®

PROF. MALCOLM HAWKESFORD (Rothamsted Research, Harpenden, Herts, UK)

15:00 **Association mapping of variation in nitrogen use efficiency in winter wheat**

WILLIAM THOMAS (the James Hutton Institute, Invergowrie, Dundee, UK), PETER WERNER, GUILLAUME BARRAL-BARON, CLAIRE FREMANN (KWS (UK) Ltd, Royston, Herts UK), HAZEL BULL, ALLAN BOOTH, JOANNE RUSSELL & LUKE RAMSAY (the James Hutton Institute, Invergowrie, Dundee, UK)

15.20 **Wheat Breeding at the Plant Breeding Institute, Cambridge UK, 1948-87, its legacy of operational research and its influence in establishing a new research paradigm**

RICHARD SUMMERS, BILL ANGUS & JOHN BINGHAM (Angus Wheat Consultants, Bury St Edmunds, UK)

15:40 TEA

Session III : Protecting Crop Potential (biotic and abiotic stresses)

16:10 *Invited Speaker*

Elevating disease resistance in crops with cloned genes

PROF. JONATHAN JONES FRS (Sainsbury Laboratory, John Innes Centre, Norwich, Norfolk, UK)

16:50 **Diversity and control of the emerging *Pepino mosaic virus***

MIGUEL ARANDA (Centro de Edafología y Biología Aplicada del Segura (CEBAS)-CSIC, Murcia, Spain)

17:10 *Invited Speaker*

Identifying physiological traits to improve crops for stressful environments

PROF. GUSTAVO SLAFER (University of Lleida, Catalonia, Spain)

17:50 **The Quest for Durable Disease Resistance - *Turnip mosaic virus* Resistance in Brassicas**

CHARLOTTE F NELLIST (University of Warwick, Wellesbourne, UK), WEI QIAN (Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing, China), CAROL E JENNER, JONATHAN D MOORE (University of Warwick, Wellesbourne, UK), SHUJIANG ZHANG, XIAOWU WANG (Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing, China), WILLIAM H BRIGGS (Syngenta Seeds, Enkhuizen, The Netherlands), GUY C BARKER (University of Warwick, Wellesbourne, UK), RIFEI SUN (Institute of Vegetables and Flowers, Chinese Academy of Agricultural Sciences, Beijing, China) & JOHN A WALSH (University of Warwick, Wellesbourne, UK)

19:30 CONFERENCE DINNER at Holiday Inn Luton South, (for invited speakers and those who have booked)

Wednesday 10 December

08:30 CONFERENCE REGISTRATION

Session IV : Agriculture and the Environment

09:00 *Invited Speaker*

Future Food: Reconnecting agriculture and the environment'. Is that suitable?
PROF. IAIN GORDON (Director, the James Hutton Institute, Invergowrie, UK)

09:40 **The Evolution of AGRI-Environment measures in the UK: from the ridiculous to the sublime**

PROF. N W SOTHERTON (The Game & Wildlife Conservation Trust, Fordingbridge, UK), A R LEAKE & C S STOATE (The Allerton Project, The Game & Wildlife Conservation Trust, Loddington, UK)

10:00 **The Past, Present and Future Prospects for Integrated Arable Farming Systems in the UK**

A R LEAKE (The Game & Wildlife Conservation Trust, Allerton Project, Loddington, Leics, UK), C J DRUMMOND (LEAF, Stoneleigh Park, Warwicks, UK) & V W L JORDAN (SMI, Mollington, Chester, UK)

10:20 **Traits for yield stability in changing environments**

PROF. MIKE GOODING (IBERS, Aberystwyth, UK)

10:40 **COFFEE**

11:10 *Invited Speaker*

Reconnecting Agriculture with Environmental and Nutritional Health
PROF. JOHN CRAWFORD (Rothamsted Research, Harpenden, Herts, UK)

11:50 **Tracking rhizosphere carbon utilization to phylogenetic and functional soil bacterial groups**

LIZ SHAW (Dept of Geography & Environmental Science, University of Reading, UK)

12:10 **Investigating cadmium-induced oxidative stress in tomato**

PROF. RICARDO ANTUNES DE AZEVEDO (ESALQ-USP, Universidade De São Paulo, Piracicaba, Brasil)

12:30 **LUNCH & POSTERS**

Session V : Diet & Health

13:30 *Invited Speaker*

Agricultural Strategies in the Fight against Micronutrient Malnutrition
PROF. ISMAIL CAKMAK (Sabanci University, Turkey)

14:10 **Strategies to reduce the accumulation of arsenic in rice grain**

ADAM PRICE (University of Aberdeen, UK)

14:30 *Invited Speaker*

Allergy and Intolerance to Plant-based Foods
PROF. CLARE MILLS (University of Manchester, Manchester, UK)

15:10 **TEA**

15:40 **Improving the Contribution of Wheat to Human Health**

PROF. PETER SHEWRY, TILL PENNY, JACKIE FREEMAN, MARK WILKINSON, ONDREJ KOSIK, ROWAN MITCHELL & ALISON LOVEGROVE (Rothamsted Research, Harpenden, UK)

16:00 **Discussion and Concluding Remarks**

PROF. BILL DAVIES (University of Lancaster, Lancaster, UK)

16:30 **END OF CONFERENCE**

POSTERS

Trends in Scottish spring barley - Tayside Case Study

STACIA STETKIEWICZ, FIONA BURNETT, CAIRISTIONA TOPP (SRUC, Edinburgh, UK) & RICHARD ENNOS (University of Edinburgh, UK)

Divergent cell wall molecular architecture of *Meloidogyne incognita* feeding sites in monocots and dicots

REFIK BOZBUGA, CATHERINE J LILLEY, PAUL KNOX & PETER E URWIN (University of Leeds, UK)

New technology to improve grass productivity

ELIZABETH HUDSON (ADAS Gleadthorpe, Notts, UK) & PETE BERRY (ADAS High Mowthorpe, N Yorks, UK)

Cadmium genotoxicity in tomato plants

PROF. RICARDO ANTUNES DE AZEVEDO (ESALQ-USP, Universidade De São Paulo, Piracicaba, Brasil)

***Burkholderia* sp. SCMS54 triggers a global stress defense in tomato enhancing cadmium tolerance**

PROF. RICARDO ANTUNES DE AZEVEDO (ESALQ-USP, Universidade De São Paulo, Piracicaba, Brasil)

Lysine metabolism in antisense C-hordein barley grains

PROF. RICARDO ANTUNES DE AZEVEDO (ESALQ-USP, Universidade De São Paulo, Piracicaba, Brasil)

Sugar beet yield trend and yield gap in the UK

AIMING QI (University of Hertfordshire, Hatfield, Herts, UK)

Evolution of photoperiodic responses in domesticated plants

IVAN TARAKANOV & NIKOLAY KHOKHLOV (Russian State Agrarian University – Moscow Timiryazev Agricultural Academy, Moscow, Russia)

Homogeneity of greenhouse microclimate

THAIS ZORZETO (College of Agricultural Engineering, State University of Campinas, São Paulo, Brazil)

Quality of cherry tomato in organic system with different cultivation forms and biofertilizer levels

THAIS ZORZETO (College of Agricultural Engineering, State University of Campinas, São Paulo, Brazil)

Spatial analysis for four populations of willows grown in a single experiment

STEPHEN POWERS (Rothamsted Research, Harpenden, UK)

Assessing Nitrogen removal with field crops across different regions in Bulgaria

N VALEVA & M NIKOLOVA (University of Forestry, Sofia, Bulgaria)

Assessing Phosphorus (Potassium) removal with field crops across different regions in Bulgaria

Y STAMENOV & M NIKOLOVA (University of Forestry, Sofia, Bulgaria)

Divergent cell wall molecular architecture of *Meloidogyne incognita* feeding sites in monocots and dicots

REFIK BOZBUGA (Centre of Plant Sciences, University of Leeds, Leeds, West Yorkshire UK)

New technology to improve grass productivity

ELIZABETH HUDSON (ADAS Gleadthorpe, Nottinghamshire, UK)

Growth and flowering response of scorpion orchid (*Arachnis maingayi*) Hook.f. Schltr to growing medium and light quality

OLATUNDE OLOSUNDE & IO O AIYELAAGBE (Dept of Horticulture, Federal University of Agriculture, Abeokuta, Nigeria)

Crop resilience through exploitation of diversity

HENRY CREISSEN (The Organic Research Centre, Wakelyns Agroforestry, Suffolk, UK; John Innes Centre, Norwich, UK), NICK FRADGLEY, SALLY HOWLETT (The Organic Research Centre, Wakelyns Agroforestry, Suffolk, UK), JAMES K M BROWN (John Innes Centre, Norwich, UK), TOVE H JORGENSEN (The University of East Anglia, Norwich, UK), THOMAS DÖRING (The Organic Research Centre, Wakelyns Agroforestry, Suffolk, UK; Humboldt University, Berlin, Germany), MARTIN M S WOLFE & ROBBIE GIRLING (The Organic Research Centre, Wakelyns Agroforestry, Fressingfield, Suffolk, UK)

Weed control in winter oats through competitive ability

NICK FRADGLEY, HELEN PEARCE, SALLY HOWLETT, HENRY CREISSEN & ROBBIE GIRLING (The Organic Research Centre, Wakelyns Agroforestry, Fressingfield, Suffolk, UK)

Effect of micronutrients on green leaf retention and grain yield of winter and spring wheat

S SHAH & S WILKINSON (Agrii Technology Centre (Agrii-Fous), Swindon, UK)

Improving the control of take-all disease in wheat

VANESSA E McMILLAN, GAIL CANNING, RICHARD J GUTTERIDGE & KIM E HAMMOND-KOSACK (Rothamsted Research, Harpenden, UK)

Challenges of increasing rice productivity in a humid tropical environment

O S ADERI, N U NDAEYO & N U A IDEM (Dept of Crop Science, University of Uyo, Uyo, Nigeria)

N, P and K Balances of Organic Crop Rotations on a Range of Soil Types

LAURENCE SMITH (The Organic Research Centre, Hamstead Marshall, Berks, UK), DAVIDE TARSITANO, CAIRISTIONA TOPP, STEPHANIE JONES (SRUC, Edinburgh, UK), CATHERINE GERRARD (The Organic Research Centre, Hamstead Marshall, Berks, UK) & ADRIAN WILLIAMS (Cranfield University, Bedford, UK)

Genetic basis of grain size variation within spike in wheat

QUAN XIE, SEAN MAYES & DEBBIE SPARKES (The University of Nottingham, Sutton Bonington Campus, Loughborough, Leics, UK)

Identification of flag leaf traits associated with nitrogen use efficiency of einkorn, emmer, spelt and break wheat

K M C FERNANDO & D L SPARKES (The University of Nottingham, Sutton Bonington Campus, Loughborough, Leics, UK)

Are oilseed rape yields limited by inadequate rooting?

CHARLOTTE WHITE (ADAS Gleadthorpe, Notts, UK) & PETE BERRY (ADAS High Mowthorpe, N Yorks, UK)

Approaches to improving seed set in winter wheat

STEVE HOAD & WESP consortium (SRUC, Edinburgh, UK)

Mapping Stakeholders' and Farmers' views on the pendimethalin herbicide use

E TSAKIRIDOU, K MATTAS & A MICHAELIDIS (Aristotle University of Thessaloniki, Greece)

Identification of physiological traits for improved biomass and N-use efficiency in wheat

ALI AMAMOU, OORBESSY GAJU, JAYALATH DE SILVA (The University of Nottingham, Sutton Bonington Campus, Loughborough, Leics, UK), SIMON GRIFFITHS (John Innes Centre, Norwich, UK), MALCOLM HAWKESFORD (Rothamsted Research, Harpenden, UK) & JOHN FOULKES (The University of Nottingham, Sutton Bonington Campus, Loughborough, Leics, UK)

Understanding decisions within Scottish arable and mixed farming systems

FRANCES RYAN, CAIRISTIONA TOPP (SRUC, Edinburgh, UK), CHRISTINE WATSON (SRUC, Aberdeen, UK), RONALD WILSON (University of Edinburgh, Edinburgh, UK) & SARAH BUCKINGHAM¹ (SRUC, Edinburgh, UK)

Trichoderma bio-inoculant ... *C. sativa*

D W KANDULA (Bio-Protection Centre, University of Lincoln, New Zealand)

Is there potential to reduce fertiliser N inputs to spring barley using leguminous cover crops in Ireland?

RICHIE HACKETT (Teagasc, Oak Park Crops Research, Carlow, Ireland)

Economic consideration of different cultivation techniques for organic spring wheat production

A V VIJAYA BHASKAR, W P DAVIES, & N D CANNON (Royal Agricultural University, Cirencester, Gloucestershire GL7 6JS, UK)

Reestablishing IPM recommendations for key insect pests of alfalfa hay in the low desert of southwestern the U.S.

AYMAN MOSTAFA (University of Arizona, Phoenix, USA)

What causes yield variability?

BERNHARD SCHAUBERGER (Potsdam Institute for Climate Impacts Research (PIK), Potsdam, Germany)

Variation in leaf traits in spring barley

ANNA FLORENCE, STEVE HOAD (SRUC, Edinburgh, UK), RICHARD ENNOS (University of Edinburgh, Edinburgh, UK) & PETER HOEBE (SRUC, Edinburgh, UK)

Morphological characterization and selection of spider plant (*Cleome gynandra*) accessions from Kenya and South Africa

D O WASONGA (University of Nairobi, Nairobi, Kenya), B G CRAMPTON (University of Pretoria, Hatfield, South Africa), D A ODENY (International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Nairobi, Kenya) & J L AMBUKO (University of Nairobi, Nairobi, Kenya)

NO and H₂S effects on stomata aperture in pepper (*Capsicum annum* L.) under salt stress and recovery conditions

MIROSLAV LISJAK, MARIJA ŠPOLJAREVIĆ, VLADIMIR ZEBEC (Josip Juraj Strossmayer University of Osijek, Osijek, Croatia), MARK E WOOD (University of Exeter, Exeter, UK), MATTHEW WHITEMAN (University of Exeter Medical School, Exeter, UK), IAN D WILSON, JOHN T HANCOCK (University of the West of England, Bristol, UK), NADA PARAĐIKOVIĆ & TIHANA TEKLIĆ (Josip Juraj Strossmayer University of Osijek, Osijek, Croatia)

Uptake and distribution of Cd in soybean (*Glycine max* (L.) Merr.)

IVANA MAKSIMOVIĆ, MARIJA ŠPOLJAREVIĆ (University of J. J. Strossmayer, Osijek, Croatia), MARINA PUTNIK-DELIĆ (University of J. J. Strossmayer, Osijek, Croatia), MIROSLAV LISJAK (University of Josip Juraj Strossmayer, Osijek, Croatia), MILAN MIROSAVLJEVIĆ, MILORAD ŽIVANOV (Institute for Field and Vegetable Crops, Novi Sad, Serbia), RUDOLF KASTORI & TIHANA TEKLIĆ (University of Josip Juraj Strossmayer, Osijek, Croatia)

Antioxidative responses induced by temperature stress in soybean (*Glycine max* (L.) Merr.) leaf at flowering

MARIJA ŠPOLJAREVIĆ, MIROSLAV LISJAK, ROSEMARY VUKOVIĆ, IVNA ŠTOLFA, DEJAN AGIĆ (Josip Juraj Strossmayer University of Osijek, Osijek, Croatia), LUKA ANDRIĆ (Agricultural Institute Osijek, Osijek, Croatia) & TIHANA TEKLIĆ (Josip Juraj Strossmayer University of Osijek, Osijek, Croatia)

Influence of contrasting cultivation techniques on spring wheat performance

K RIAL LOVERA, A V VIJAYA BHASKAR, N D CANNON & W P DAVIES (The Royal Agricultural University, Cirencester Gloucestershire, UK)

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

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BOOKING FORM

SURNAME: INITIALS:

TITLE (Prof/Dr/Mr/Mrs/Ms or other):

PREFERRED NAME FOR BADGING:

STATUS (Delete as appropriate): AAB Member/Retired Member/Student Member
 Non-Member*/Student Non-Member*

MAILING ADDRESS:

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..... POST CODE:

Tel No:Fax No:E-mail:

NOTES

1. STUDENTS. It is the Association's policy to grant reduced registration fees to students. This provision is subject to space being available and booking forms must be accompanied by a signed statement from the student's supervisor attesting that he/she is a full-time student. If students would like to apply for an AAB Student Travel Grant - please send your request in writing to the AAB Office. Forms are available on the AAB Web Page: <http://www.aab.org.uk>

2. Conferences of the Association are private but visitors are most welcome. The publishing of reports of papers given at these conferences should only be done with the permission of the organiser and the authors of the papers concerned, who may require to see proofs before this permission is given.

3. The Association would like to send you details of relevant conferences in the future. Please tick box if you do not want to receive these details

4. Please note that photographs are sometimes taken at AAB conferences which we publish in our Newsletter to members.

*AAB full membership for 2014/15 is £55.00 and £20.00 for students
For further details on membership contact the AAB Office

