

Crop Genomics and Crop Improvement

on 5-6 December 2012

at the John Jarrold Room, Sportspark,
University of East Anglia, Norwich, UK

The first sequenced genome of a plant, *Arabidopsis thaliana*, was published c.12 years ago (Arabidopsis Genome Initiative, 2000). Since that time, the genome sequences for more than twenty important crops have been completed and these are providing opportunities for both improving our understanding of the history of plant domestication and to accelerate crop improvement. Crop plant genomics is now firmly embedded in the breeding of many crops, improving the precision of breeding and enabling the assembly of multiple traits in new elite breeding lines and varieties. These advances will take plant breeding and trait analysis to a new level of accuracy and productivity that will be needed to meet the major challenges of increased food production in the coming years.

This conference seeks to bring together research in these areas and also focus on the application of markers for genetic improvement of our important crops through molecular marker assisted selection. The conference will focus on the basic and applied aspects of plant genomics, current developments in genome sequencing of our major crop plants in the UK and role of molecular breeding in crop improvement, including marker assisted trait introgression.

Programme

Wednesday 5th December

- 10:15 **Meet at TGAC, John Innes Centre to collect conference badges**
- 10:30 **Tour of the Genome Analysis Centre at the John Innes Centre, Norwich with an overview of TGAC by the Director, Professor Jane Rogers**
- 11:30 **Travel to SportsPark, University of East Anglia**
- 12:00 **LUNCH**
- 13:00 **CONFERENCE REGISTRATION at the John Jarrold Room, SportsPark, University of East Anglia & TEA/COFFEE**
- 13:30 **INTRODUCTION**
FINLAY DALE (The James Hutton Institute, Dundee)

Session 1: Chair IAN MACKAY (NIAB, Cambridge)

- 13:40 *Invited speaker*
Application of targeted genome sequencing to high throughput genotyping in allohexaploid wheat
KEITH J EDWARDS (University of Bristol)
- 14:10 **Breeding high yielding wheat with low lodging risk**
ZOE RUTTERFORD (ADAS Boxworth, Cambridge), S BERRY (Limagrain Ltd, Docking, Norfolk) S GRIFFITHS, JUN MA (John Innes Centre, Norwich) & P BERRY (ADAS High Mowthorpe, Malton, N Yorks)
- 14:30 *Invited speaker*
An integrated programme for the identification of useful genetic variation for UK bread wheat
SIMON GRIFFITHS (John Innes Centre, Norwich)
- 15:00 **Evolutionary changes in composite cross populations of winter wheat in two crop husbandry systems**
SAMUEL KNAPP, JOHN SNAPE (John Innes Centre, Norwich), THOMAS F DÖRING & MARTIN S WOLFE (The Organic Research Centre, Hamstead Marshall) & SIMON GRIFFITHS (John Innes Centre, Norwich)

15:20 **TEA**

Session 2: Chair FINLAY DALE (JHI, Dundee)

- 16:00 *Invited speaker*
Pathogen effector driven search for more durable disease resistance in potato
XINWEI CHEN, DAVID COOKE, GLENN BRYAN, ELEANOR GILROY (The James Hutton Institute, Dundee), FLORIAN JUPE, SOPHIEN KAMOUN, JONATHAN JONES (The Sainsbury Laboratory, Norwich), PAUL BIRCH & INGO HEIN (The James Hutton Institute, Dundee)
- 16:30 *Invited speaker*
Identification and functional characterisation of effectors from the genome of the potato cyst nematode *Globodera pallida*
P THORPE, P J A COCK, S MANTELIN (The James Hutton Institute, Dundee), J COTTON, A REID (Wellcome Trust Sanger Institute, Cambridge), C LILLEY, P URWIN (University of Leeds), V BLOK & JOHN JONES (The James Hutton Institute, Dundee)
- 17:00 *Invited speaker*
Application of the potato genome to genetical studies
GLENN BRYAN & SANJEEV K SHARMA (The James Hutton Institute, Dundee)
- 17.30 **DISCUSSION**
- 20:00 **CONFERENCE DINNER IN THE VISTA RESTAURANT**

Thursday 6th December

08:45 **CONFERENCE REGISTRATION & COFFEE**

Session 3: Chair SIMON GRIFFITHS (JIC, Norwich)

09:10 *Invited speaker*
Wheat rust resistance genes galore – but which ones to breed with?
PAULINE BANSEPT, ROSEMARY BAYLES, LESLEY BOYD (NIAB, Cambridge), SIMON GRIFFITHS (John Innes Centre, Norwich) & DONAL M O’SULLIVAN (NIAB, Cambridge)

09:40 *Invited speaker*
A Multiparent Advanced Generation Intercross of wheat: First results
IAN MACKAY, PHIL HOWELL & JOHN BINGHAM (NIAB, Cambridge)

10:10 **Unlocking the potential of *beta* germplasm: Disease resistance for the future**
LUCY JAMES, KATHY BEAN (Rothamsted Research, Broom’s Barn, Bury St Edmunds), MIKE GRIMMER (ADAS Boxworth, Cambridge), STEVE BARNES (SESVanderHave, Tienen, Belgium), THOMAS KRAFT (SESVanderHave, Tienen, Belgium) & MARK STEVENS (Rothamsted Research, Broom’s Barn, Bury St Edmunds)

10:30 **Molecular and biochemical characterization of *Solanum torvum*, *Solanum anguivi* and *Solanum aethiopicum* (Eggplant) varieties in Ghana**
LINDA ABROKWAH, M D QUAIN & A OPPONG, A AGYEMANG & E OFFEI-BONSU (CSIR-Crops Research Institute, Kumasi, GHANA)

10:50 **DISCUSSION**

11:00 **COFFEE**

Session 4: Chair GLENN BRYAN (JHI, Dundee)

11:30 *Invited speaker*
When complex traits are complex: GWAS dissection of seasonal adaptation in UK barley
JORDI COMADRAN (The James Hutton Institute, Dundee)

12:00 *Invited speaker*
The barley Multi-Cross Mapping Matrix
HAZEL BULL, RICHARD KEITH, MALCOLM MACAULAY, PETE HEDLEY & WILLIAM THOMAS (The James Hutton Institute, Dundee)

12:30 **DISCUSSION**

12:45 **LUNCH**

Session 5: Chair BILL THOMAS (JHI, Dundee)

13:45 *Invited speaker*
Pea genetics and genomics in relation to crop improvement
NOEL ELLIS (IBERS, Aberystwyth University)

14:15 *Invited speaker*
Using genetic and genomic resources in breeding improved pearl millet cultivars that are resistant to biotic and abiotic stresses and have improved nutritional quality
RATTAN YADAV, D SEHGAL (IBERS, Aberystwyth University), R K SRIVASTAVA (ICRISAT, Patancheru, India), P C SHARMA (CSSRI, Karnal, India), C J HOWARTH (IBERS, Aberystwyth University) & C T HASH (ICRISAT, Patancheru, India)

14:45 **Marker assisted selection for disease resistance and grain quality in oats**
CATHERINE HOWARTH, IRENE GRIFFITHS & SANDY COWAN (IGER Aberystwyth, Ceredigion)

15:05 **DISCUSSION**

15:20 **TEA & DEPART**

POSTER

SNP assay to distinguish Barley varieties and predict traits
HEATHER OWEN, DAVID KENYON, JONATHAN DAVEY (SASA, Edinburgh), JOANNE RUSSELL, LUKE RAMSAY & ALLAN BOOTH (The James Hutton Institute, Dundee)