



## WGIN Management Meeting + Field trip

20 July 2011, Rothamsted Research

### MINUTES

#### **Attendees:**

Peter Shewry, Simon Griffiths, Simon Orford, Malcolm Hawkesford, John Foulkes, Kim Hammond-Kosack, Richard Gutteridge, Lesley Smart, Peter Werner, Neil Paveley, Mike Grimmer, Bill Angus, Dhan Bhandari, Andy Greenland, Sarah Holdgate, Helen Jenkins, Suzanne Thrusell

#### **Apologies:**

Matt Kerton, Peter Jack, Simon Berry, Farhana Amin, Susannah Bolton, Tina Barsby, James Melichar, Thomas Joliffe, Richard Weightman, David Feuerhelm, Julie Seekings, Simon Penson, Maurice Moloney

#### **Welcome – Peter Shewry**

**Objectives 2, 3 and 4 - Tools and Resources - *Simon Griffiths* Power Point presentation (001 SG WGIN July 2011)**

#### Additional Information:

Q. What is the Gediflux collection?

A. The Gediflux collection contains major Western European winter wheat varieties since 1945; selection was based on varieties occupying over 5% winter wheat acreage in the country of use.

C. JIC in 2010/2011 has the Gediflux collection in a 3 rep trial.

C. The Watkins collection – the markers used are not DaRT, but simple sequence repeat (SSR).

Q. Phenotyping is extremely important for information going into the wheat LoLa. But how will you handle the vast output. Could the breeders help here?

A. Breeders expertise in running yield trials for selected segregating populations and assessing near isogenic lines (NILs) as pre breeding materials would be a unique contribution to WGIN and LOLA.

Q. Can the three mapping populations where Paragon has been crossed to another spring habit cultivar be considered spring.

A. No. The parents may differ in the spring alleles they possess. Therefore these populations need to be grown as winter types with a vernalisation period.

**Objective 7 – Insect Resistance – Lesley Smart** *No presentation. The final written report for this project will be placed on the WGIN website in July 2011.*

**Objective 8 – NUE and QTLs linked to NUE – Malcolm Hawkesford** *Power Point presentation (002 MH WGIN July 2011)*

Additional Information:

C. The root architecture phenotyping of the Avalon x Cadenza population is being done as part of another project.

Q. Now that you have 5-6 years of field phenotyping data, could you consider exploring senescence traits?

A. We do have some senescence scoring, particularly for recent years. There is a high year to year variation in this trait, which would make this type of analysis difficult. Early senescence is linked to early flowering.

Q. Due to the unusually dry late winter and spring, how well were the three N applications taken up?

A. There was sufficient moisture to allow the N to be taken up. The late wet period has caused additional late tillering which was problematic.

Q. The drought tolerant cultivar Garcia, should this be considered as a candidate for the diversity trial (years 9 and 10)?

A. This is not Northern European elite genotype and was not included in John Foulkes' drought trials at Nottingham. So not to be included.

**Objective 9 - Drought tolerance - John Foulkes**  
*Power Point presentation (003 JF WGIN July 2011)*

Additional information:

Q.  $\Delta^{13}C$  (inversely related to WUE) measurements are used in Australia and varieties now in the market place, e.g. Drysdale and Rees, were selected using this technique. As you have found a good positive correlation between grain  $\Delta^{13}C$  and grain yield under UK drought conditions, is there scope to use  $\Delta^{13}C$  also as a selection tool in the UK?

A. In Australia, the main selection criteria for yield is a high WUE. In the UK, season-long water use is the main driver for yield under drought. However, since there is a positive correlation between  $\Delta^{13}C$  and stomatal conductance (= leaf transpiration), there is scope for using  $\Delta^{13}C$  as an indirect measurement of water use and grain yield in the UK.

Q. So why is this relationship the other way around in Australia compared to the Mediterranean and the UK droughts?

A. In Australia drought yields are typically 1-2 t/ha. Limited water is available during the season to the crop and higher yields are associated with reduced stomatal

conductance (low  $\Delta^{13}\text{C}$  and high WUE); all the water available to the crop during the season will be used even with reduced stomatal conductance. In Mediterranean and UK droughts where yields are typically in the range 3-7 t/ha, more water is available to the crop and the strategy of reduced stomatal conductance (low  $\Delta^{13}\text{C}$ , high WUE) is disadvantageous compared to the strategy of using more water (i.e. open stomata, high stomatal conductance, high  $\Delta^{13}\text{C}$ , low WUE and high season-long water use).

Q. In absolute values, what would be the water saved by using a high WUE cultivar?

A. For 1kg biomass increase in the UK, an average cultivar would use ~200kg water, whereas a high WUE would use ~175 kg water. So approximately 10-15% less water.

**Objective 10 – Take-all disease –Richard Gutteridge** *Power Point presentation (005 RG WGIN July 2011, RRes)*

Additional information:

The 2010/2011 season so far has only yielded slight take-all disease ratings on the roots. However, this level of infection is still likely to lead to a 1.2 t/h loss in yield.

Severe take-all reduces N fertilizer uptake by up to 1/3<sup>rd</sup>.

## Discussion

**Cereals 2011 event.** All were very pleased how the joint JIC demonstration of the wheat chromosomes on the RRes stand had worked. Considered whether the BBSRC talks could have been held on the RREs stand nearby the live demonstrations.

The A x C lines grown at two different N levels failed to show any obvious phenotypic differences. Similar material was displayed on Velcourt's stand.

Could the root architecture display come further forward on the stand?

Cereals 2012 will be at the same location in Lincolnshire. JIC (SG/SO) and RRes (MH) plan to display the Lola Diversity germplasm. There is also to be a take-all display. On the neighbouring HGCA stand, if those who are manning the RL wheat display know in advance what we are showing on the RRes stand on the WGIN project, then they could send interested visitors in our direction.

**WGIN Stakeholders meeting RRes** – 22<sup>nd</sup> November 2011. Possible topics and possible speakers / panellists were considered. We also need to prepare in advance the questions to be put to the panellists. Panel discussion on 'Successful 2<sup>nd</sup> and 3<sup>rd</sup> wheats'

*All – please send potential questions to KHK*

## AOB

The World Wheat Book, A History of Wheat Breeding, Volume 2. Authors: A.P. Bonjean, W.J. Angus and M. van Ginkel.

ISBN: 978-2-7430-1102-4. Lavoisier 1100 pages.

Comment Bill Angus – all new contents.

## **Afternoon Field tour – Lead by Malcolm Hawkesford and Richard Gutteridge**

Field - Great Harpenden 1: NUE Avalon x Cadenza mapping population all 203 lines x 3 reps – 200 kg N/h

Field - Meadow: NUE Diversity 25 lines x 4 N rates x 3 reps

Also looked at the 1 m x 1 m plots of the Wheat Pre-breeding LoLa (also on Meadow) which includes Watkins and Gediflux lines (from JIC) as well as synthetics from NIAB.

Field - Claycroft: A 3<sup>rd</sup> wheat situation Take-all resistance in the Watkins, Gediflux collections and the *T. monococcum* and *T. tauschii* (LoLa)

Field - Pastures: The extended Avalon x Cadenza mapping population seed multiplication plots. An additional ~450 DH lines grown in either 6 m x 1.5 m plots or 3 m x 1.5 m plots. Single plot for each DH line.

**Date of next Management meeting** 11th November 2011, at KWS Ltd.