**WGIN Management Meeting**

**3rd July 2013 @ Rothamsted Research**

**FINAL Minutes**

**Attendees**:-

Peter Shewry, Kim Hammond-Kosack, Malcolm Hawkesford, Simon Griffiths, John Foulkes, Sue Freeman, Matt Kerton, Vanessa McMillan, David Cooper, Dhan Bhandari, Ellie Marshall, Stephen Smith, Peter Jack, Maria Herse, Ed Flatman, Jacob Lage, Steve Thomas, Andy Greenland, Ed Byrne, Suzanne Thrussell

**Apologies**

Simon Berry, Cathy Mumford, Jayne Brookman, Keith Edwards, Simon Penson, Mike Grimmer, Sarah Holdgate, Thomas Joliffe, Neil Paveley, David Feuerhelm, Sam Millar, Simon Bright, Peter Werner

**Welcome** – Peter Shewry

**Actions from the last meeting**

A Wikispace has now been set up for WGIN. Each company will have access with password controls for Datasets which have not been published and therefore not in the public domain can be put on this website and accessed securely. An email will be sent out in the next 2-3 weeks with information on how to set up your wiki account.

**ACTION**

**RESEARCH UPDATES**

**Objective 2, 3 and 4 – Tools and Resources (Simon Griffiths)**

Presentation

Simon provided an update on his objectives with the focus this time round specifically on NILs.

QTL results and summary for the small plot phenotype data for the AxC DH population are now available on the WGIN website.

Due to the weather we are now in a vulnerable situation because we only have 1 rep of the large plot experiment in the ground. **Post meeting note: All three replicates are sown now.**

The core AxC population was developed prior to WGIN and is publically available. Rothamsted have the rights to the extended population which is also publically available. The KASPar marker map has been developed as part of a BBSRC CIRC grant CIRC have agreed that the integrated SSR /KASPar map can be put on the WGIN website.

A map has now been produced for Paragon x Chinese Spring (PxCS). The Paragon x Garcia (PxG) population is at F4 of single seed descent and will have a map developed for it within the period of WGIN2. PxG was developed for the drought tolerance project (WGIN objective 9). The PxCS map was developed as part of a BBSRC CIRC project called ‘Development and validation of a flexible genotyping platform for wheat’. Both populations are available through WGIN. All information is available to view on the WGIN Website with the permission of the CIRC.

Questions

Q. Do the Height QTLs control taller rather than shorter crops?

A. In all cases, other than the RHT21, Cadenza carries the height increasing alleles.

Q. Is each QTL available reciprocally?

A. All NILs except for yield are reciprocal i.e. Cadenza allele into Avalon and Avalon allele into Cadenza.

Q. Are all the height QTLs mapping to the ends of the chromosomes?

A. It depends, 3A appears centromeric. Whilst 2D is distal to Ppd1 on 2D.

Q. With the Malacca x Hereward NIL population at what stage are you up to?

A. Backcross 4 derived homozygotes are multiplied and field drilled.

Looking forward

* Now that we have better maps for Malacca x Hereward it is desirable to reanalyse these QTL to see how much variation the NILs are likely to capture.
* PS suggested further work on non-gluten quality could be a future priority.

**Objective 8 – NUE (Malcolm Hawkesford)**

[Presentation](http://www.wgin.org.uk/information/documents/AssociatedDocuments06112012.pdf)

The Variety Diversity Trial

In total 9 years of data were shown, which includes figures for 2012. There have been 47 different varieties tested for at least 1 year, over a 10 year period. The data gives us a lot of information on the stability of the various traits measured. Grain and straw material from the trials for each year have been stored.

The 2013 trial has been drilled. This is one of the few trials at RRes to be put in the ground so far.

Changes to variety this year are:-

2 x AxC lines have been removed

AC Barrie and Cocoon have been added, due to being tall varieties.

See [WGIN stakeholders Newsletter 2012](http://www.wgin.org.uk/stakeholders/WGIN_NL_November_2012.pdf), for the full variety list

Looking forward

* A huge analysis can be undertaken on the 10 year run of data. So far only Peter Barraclough’s paper *(Barraclough PB, Howarth JR, Jones J, Lopez-Bellido R, Parmar S, Shepherd CE, Hawkesford MJ (2010) Nitrogen efficiency of wheat: genotypic and environmental variation and prospects for improvement. Eur J Agron 33, 1-11.)* has been published, which covers only the first 4 years of data
* Possibility of spin off project because of the great contrast in growing seasons in recent years. This project could be on breeding for stability.

Avalon x Cadenza Trial

Now have data from six field trials for NUE. Next step is to complete the analysis. For some of these trials, the final yield data and the derived QTL are very variable from year to year. The key objective will be to look in detail at the NUE parameters linked in with yield. Generally yield per se is difficult to analyse.

Q. Yield stability – has the date of sowing been plotted against this data?

A. Sowing dates have not varied sufficiently to affect the comparability of the datasets. The summer rainfall will contribute mostly to effects on yield.

Q. Have you look at Canopy senescence?

A. Yes

**Objective 9 – Drought Tolerance (John Foulkes)**

[Presentation](http://www.wgin.org.uk/information/documents/AssociatedDocuments06112012.pdf)

John provided an update on the Drought Tolerance project. John confirmed that novel data are coming out of the ∆18O analysis in combination with ∆13C for the panel of 18 cultivars identifying genotypes showing positive departures from the overall negative relationship between water-use efficiency and water use.

There has been limited useful data available from the 2012 Rialto x Savannah population, due to the high rainfall and lack of drought. It was not due to be sown this year however to ensure we have 2 years of data, the Rialto x Savannah population will have to be sown in 2012-13. It was decided not to mill the grain from this year but to store the grain samples. However, these samples will not be submitted for grain ∆13C analyses and 2012-13 grain samples will be analysed for Δ 13C instead.

Questions

Q. In principle can you take any useful material and do ∆13C. What are costs of doing so and do you need repeats?

A. £12-£15 per sample – every 10th sample needs to be repeated. ∆18O is £18

Q. Could you go back through stored samples and would it give a good ∆13C indicator?

A. Need to estimate the soil moisture deficit to define stress in the experiments for which stored grain samples are available to identify the most useful experiments where C13 analysis could be carried out on stored samples.

Q. In your mapping population, is Garcia awned?

A. Garcia is not awned; results from DH lines of a Beaver x Soissons population segregating for awns show a minimal effect of awns on grain Δ 13C.

Looking forward

* Early drilling could this improve drought tolerance through deeper rooting
* Explore mechanisms determining interactions between root traits affecting water uptake and other above ground traits (stomatal conductance, stay green)
* Develop isogenic lines for grain Δ 13C QTL for fine mapping/detailed physiological studies

**Objective 10 – Take-All Disease (Kim Hammond-Kosack)**

[Presentation](http://www.wgin.org.uk/information/documents/AssociatedDocuments06112012.pdf)

Kim confirmed that Vanessa McMillan has now started as Richard Gutteridge’s replacement at RRes.

Currently up to 4th year on the wheat variety rotational trial.

Looking forward

* There is a TSB project in place using the A x C population to fine map the QTLs controlling low Take-all inoculum build up
* Any NUE trials done by Malcolm could be oversown with either Oakley or Conqueror to explore the effect of a 1st wheat on 2nd wheat yields
* To explore the mechanism(s) controlling the take-all inoculum build up trait. For example, does Cadenza release a chemistry from roots that influences the take-all fungus or are there major differences in root architecture between cultivars?
* We need to narrow down time of year the take-all inoculuum build up takes place.
* Could the degree of tillering influence the trait. Cadenza is the lowest tillering variety in the diversity trial. But other varieties that possess the trait, like Solstice, have a far higher number of tillers.
* Pedigree analysis of this trait would be highly informative.

**In the afternoon**

A tour of the WGIN Field trails at Rotamsted Research followed by a cream tea at the Rothamsted Manor House