

WGIN – Minutes of 1<sup>st</sup> Management meeting – Nov 2003

## **WGIN – 1st MANAGEMENT TEAM MEETING**

November 2003 at Rothamsted Research

Present: Peter Shewry, Andy Phillips, Kim Hammond-Kosack, John Snape, Bruno Viegas, Neil Paveley, Graham Jellis, John Foulkes, Mike Holdsworth, Stephen Smith, Philip Howell, Richard Summers, Chris Chapman, Bill Angus, David Feuerhelm, Chris Green, Thomas Jolliffe

KHK 20<sup>th</sup> February, 2004

### **Agenda items**

- 1 EXISTING DATASETS– HGCA**
- 2. WHEAT TRAITS – A. Quality and B. Agronomy**
- 3. WGIN FIELD TRIALS 2003-2004**
- 4. MAPPING POPULATIONS**
- 5. WGIN WEBSITE**
- 6. WGIN PUBLICATIONS**
- 7. FORTHCOMING EVENTS**

#### **1. EXISTING DATASETS – HGCA**

Recommended list data - This is available free of charge from HGCA. From March 2004, it will be accessible via RLPlus (which will include historical data). Permission to use data should be sought from Dr Jim McVittie, who will liaise with BSPB as required.

National list information – Permission to use NL data should be sought initially from Defra, Plant Varieties and Seeds, in Cambridge.

A set of the standard protocols is given in the document **WGIN 2003-M1 – BSPB Trials Protocols 2002-03**

#### **2. WHEAT TRAITS –**

##### **A. Quality**

- *Selenium content*– explored by nutritionalists at U of Newcastle, generally levels are low in the UK soils and hence wheat. Previous studies at RRes indicate that the selenium content of wheat shows little variation but can be regulated by additions to soil.
- *Cadmium content* – more of a problem in barley than wheat
- *Grain composition* – sampling needs to be done over multiple sites and also the baking of a loaf of bread is required which is expensive.
- *Grain texture and hardness*- NIR method requires 5 g grain (JIC), Perten 300 grains. Examined at 13% protein content. A lot of information is already available on grain texture.

- *Animal feed* (AIC – Newcastle). A scoping desktop study has been funded by Defra involving ADAS, U of Reading and Harper Adams. This year long study started in April 2002. At the moment there is little information available. HGCA project reports in this area are No PRC 111, 177, 253, 260 and 273.

Animal feed is high value. The poultry industry will benefit from the removal of 1B/1R translocation as it is associated with reduced nutritional value via high arabinoxylans (HGCA Report No 253).

- *Industrial Uses* - This is a highly fragmented market and so is a difficult area.
  - National Non-food Crops Centre (Innovation Centre, York Science Park, [www.nnfcc.co.uk](http://www.nnfcc.co.uk)) Peter Lilford - Chairman (pl8@york.ac.uk).
  - Tate and Lyle – Amylum group see [www.tateandlyle.com/Amylum/default.htm](http://www.tateandlyle.com/Amylum/default.htm) – non –specialist uses.
  - National Starch - can do a lot chemically

The quality traits are summarised in the WGIN Traits PowerPoint slide set (**Document WGIN 2003- M2- Traits**)

## **B. Agronomy**

- *Water Use Efficiency* - Measurement involves a range of methodologies and long term studies. For example, (1) Carbon 12/13 isotope tests on leaf and grain samples, (2) unit biomass per unit water uptake, (3) gas exchange analysis –flag leaf. Fact – 20 mm rain is required to produce 1 tonne of biomass. Introduction of the dwarfing genes may have reduced water use efficiency. This conclusion was drawn by Dr John Foulkes, (U of Nottingham) using isogenic lines. (Information from DEFRA Project OC9602 suggested Rht-D1b isogenic in Mercia exhibited lower WUE than tall control in field experiments at Gleadthorpe 1998 -2000).
- *Straw strength* – This is measured by using a lodging meter and is destructive (U of Nottingham).
- *Canopy Architecture* - ADAS commission on disease escape (2003-2007) – Neil Paveley. In addition Mikhail Semenov (RREs) has been modelling canopy architecture traits – Defra project No AR0906, entitled ‘A Rational Basis for Design of Wheat Canopy Ideotypes for UK Environments’. Publication: Lawless C, Semenov MA and Jamieson PD ‘A wheat canopy model linking leaf area and phenology’, *European Journal of Agronomy* (in press). Most of the breeders are skeptical of the value of canopy architecture as a trait. However, if herbicides are removed, it could be more valuable in a weed suppression context.
- *Stay green genes* – The stay green trait can have a range of origins and be non-functional (i.e. just green) or functional (i.e. photosynthesis).

The agronomy traits are summarised in the WGIN Traits PowerPoint slide set (**Document WGIN 2003- M2-Traits**).

Three agronomy traits were proposed for short scoping studies to be completed in the first half of 2004. These were (1) novel sources of resistance to Take-all; (2) novel sources of resistance to wheat bulb fly, Gout fly, aphids; and (3) Water Use Efficiency.

### 3. WGIN FIELD TRIALS 2003-2004

Four field trials are in progress

- *Hexaploid wheat genotype diversity analyses* – Location JIC, contacts - Mike Ambrose and Simon Orford. A collection of 474 germplasm is being grown as 2 x 1 m rows. The complete list of genotypes is listed in **Document WGIN 2003- M3- Hexaploid wheat diversity -JIC.**
- *EMS mutagenised population of the winter wheat cv Mercia carrying the extreme Rht3 (Rht-B1c) dwarfing gene* – Location RRes. Contact - Andy Phillips. 20,000 grain were mutagenised using a range of EMS concentrations and the grain was subsequently sown individually.
- *EMS mutagenised population of the spring wheat cv. Cadenza.* Location RRes. Contact - Andy Phillips.
- *T. monococcum diversity analysis for enhanced disease resistance to Septoria leaf blotch.* Location RRes. Contact – Kim Hammond-Kosack. Twenty-six diploid accessions from The Vavilov Institute, St. Petersburg, Russia and 3 other selected lines have been sown to generate single plants in 1 x 1m plots to assess for their resistance to natural *Septoria tritici* infections during the autumn, winter and early spring. Fungal isolates priming the epidemic will be recovered from individual lesions.
- *Nitrogen Use Efficiency and Canopy Architecture.* Location RRes. Contact – Kim Hammond-Kosack, Peter Barraclough and Mikhail Semenov. Thirty cultivars of winter wheat and one cultivar of spring wheat have been selected for this trial. **(Document WGIN 2003- M4 – NUE and Canopy Architecture Field Trial – Cultivar list 2003).** The nitrogen regimes deployed are 0, 100, 200, 350 kg N/ hc. Full details of the 4 replicated blocks trial are described in **Document WGIN 2003- M5 - NUE and Canopy Architecture Field Trial – Experimental Details.**

### 4. MAPPING POPULATIONS

*A UK reference mapping population* was nominated at this meeting. This is **Avalon x Cadenza**, which is a Winter x Spring cross. 203 double haploid lines have been generated by JIC. Seed is already available for 116 lines and seed for the remaining lines will become available in 2004. The contact names for further information and for seed requests at JIC are John Snape and Liz Sayers. This population is completely IP free. So far 50 SSR markers have been mapped on 60 of the DH lines and a further 128 SSR markers that exhibit polymorphism are available for mapped on this population by JIC. **(Document WGIN 2003- M6 – Avalon x Cadenza mapping population – not yet available)**

Selection of a second mapping population for specific traits.

*Nine other mapping populations* are available that are also IP free **Document WGIN 2003- M7 – IP free mapping populations.**

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Three Action item for all

1. To provide trait information on all of the cultivars listed in the 10 IP free mapping populations
2. To provide trait information on Avalon and Cadenza
3. To provide information on other mapping populations that are covered by IP, but which the breeders would be prepared to share with others.

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**5. WGIN WEBSITE** – The website address selected is [www.WIGN.org.UK](http://www.WIGN.org.UK). Note the originally selected web site address is not possible because the inclusion of NET indicates a special type of website with restrictions that were not appropriate for the WGIN activities envisaged. The site is currently under construction and Beta testing with a pre-selected user community will commence in quarter 1 2004.

**6. WGIN PUBLICATIONS** - Two articles have appeared

Anon (2003) Concerted approach to crop breeding for more sustainable agriculture. BBSRC Business (Oct) p10.

Anon (2003) Major new initiative boosts crop genetics and breeding research. RRA Newsletter, Rothamsted Research Association, 11, Oct, p4.

**7. FORTHCOMING EVENTS**

26<sup>th</sup> Feb 2004 - Next WGIN management meeting. To be held at Nickersons PB Woolpit, Suffolk (venue confirmed).

10-11<sup>th</sup> March 2004 - Association of Applied Biologists – Centenary Symposium. WGIN and OREGIN. Oral Presentation by Kim Hammond-Kosack – Title ‘Improving the effectiveness of UK genetic science for wheat and oilseed rape through a novel, integrated network of research’.