

# Minutes of PCGIN Steering/Management Meeting

Nickerson-Advanta, Docking, Norfolk  
18<sup>th</sup> January 2008 (10:30 – 14:30)

## Present

JIC	Noel Ellis
JIC	Claire Domoney
JIC	Mike Ambrose
Nickerson-Advanta	Keith Fox ( Host)
PGRO	Barrie Smith
NIAB	Jane Thomas
NIAB	Haidee Philpott
NIAB	Simon Kightley
NIAB	Donal O'Sullivan
JIC	Mary Wade

Keith Fox chaired the meeting and welcomed all participants to Docking.

**1. Apologies:** A. Biddle, A. Charlton, M. Buurman, C. Goodsall

## **2. Minutes of stakeholder meeting held at Birds Eye (4/10/07) & Final report on 2006 plot trial data**

Correction to minutes – Vicia LINK start date should read 1<sup>st</sup> August 2007 not 2008.

An update on the LINK was provided by KF with input from DO'S. Work is underway with successful PGRO chemical trials throughout the UK during 2007. These trials were based on the French system described by Frederic Muel at the PCGIN stakeholders' meeting in September 2006 when he was asked by PCGIN to speak specifically about this subject. Screening for resistance is planned for 600 *Vicia* variant lines representing very diverse material being grown at NIAB.

### **2006 Plot Trial data:**

KF queried date for completion of the 2006 pea trial data. **MA asked for date to be set for completion, agreed as 31/3/08.**

## **3. Data from 2007 plot trials and plans for 2008 (MA)**

- **MW to put PGRO data on a spreadsheet** and NIAB already supplied an excel spreadsheet with 2007 data which is almost complete. **JIC data still to be collated for MW (MA)**. MA presented the JIC 2007 pea data for canopy height at full flower and at maturity.
- CD (with assistance from Carol Moreau, JIC) has had a preliminary look at the 2007 NIAB pea data. Plots of harvest index (HI, a good measure of yield) indicate that some lines are comparable to Cooper with similar middle/edge performance. A comparison with 2006 NIAB data shows that some lines performed in a very reproducible way, as far as HI is concerned, over the two seasons. Given the contrasting weather in the two years (hot/dry in 2006, cold/wet in 2007), the data point to lines that are tolerant of poor conditions. KF pointed out that such tolerant lines are required to deal with the poor contrasting climates of

the future, where 'poor' can mean any extreme condition. These analyses need to be extended to the JIC and PGRO data.

- BS gave a synthesis of his data: pea favourites to be re-grown as JI 188, 399, 813, 1194, Cooper, and the 3 x RILs which need a repeat analysis. He asked if any new pea exotics? There are but these are not sufficiently advanced, e.g., JI 2201 is in crosses but currently at F<sub>2</sub> generation.
- The NIAB *Vicia* data are in an Excel format – if this template is acceptable, use for all. It was agreed to re-analyse the same *Vicia* lines, with a new low tannin/vc/cvc line, possibly Fevita, from Gerard Duc, INRA-Dijon. *Vicia narbonensis* had been sown at the pea rate at PGRO (fine). NIAB found this line was sensitive to herbicide and aphicide.
- SK asked about nodulation tests. NE had the relevant papers from Peter Young's work. This analysis would not have included any JI line above 2000 (more recent JI accessions). MA suggested that a maximum of 10 of the chosen pea lines be sown in rows (10 seeds of every line) to dig up at seed set to score nodulation. NE mentioned some of J.J. Drevon's work showing variation in nodulation between plants adjacent to each other. For 3 sites in 2008, 10 plants in rows, just score as +/- nodules and record their colour, after the pods have set.
- Different sites and variant nutrients can affect the results of nodulation. It is also possible to get some ineffective nodulation.

#### **Summary: Seeds for 2008 Microplots**

It was agreed that the same pea/bean lines will be analysed in 2008. BS said faba seeds will be needed. MA will collate data on seed availability next week (Jan. 21-25). KF asked if another meeting of MA, BS and JT was necessary. It was agreed that email & phone will suffice.

KF asked about reporting date to Defra. Annual report should be submitted to Defra in early May this year (CD, NE), so that discussions with Defra will follow the submission. The 2007 data collation and analysis is needed before then. MW will collate all 2007 plot trial data into two workbooks (pea and bean). MA to provide MW with JIC data and consult with HP for some data analysis.

#### **Discussion on Faba Bean**

The intention in 2007 had been to look at exotic material and the results showed many differences. Some lines produced a lot of branching and not many beans produced on the main stem but were produced on the branches. Dry weather results in very poor pod setting and therefore the bean trials in the last 2 years have shown very poor results. There is no relation between the number of flowers produced and pod set. KF suggested that material grown should be as wide as possible and emphasis on recording branches.

- Trials should be grown in the glasshouse, and to exclude insects, to look at seed set i.e. self pollination. MA to do this at JIC.
- NE asked if it was important to restrict flowers to give an indication of number of set pods.
- BA suggested recording flowering nodes at flowering time and pod nodes at harvest time.

#### **4. Combining and vining pea RIL (Recombinant Inbred Lines) update (NE, JT)**

- At JIC in 2007 there had been a problem with plant disease and consequent seed set in the glasshouses; therefore a generation of RILs was lost. Fortunately JT (NIAB) was able to grow some of the JIC populations at NIAB. NE and CD would like to record thanks formally to JT for her dedication and assistance. JIC is a generation behind but JT reported that the F<sub>4</sub>

seed should be ready to sow in 4 weeks time. It may be possible to get through an extra generation this year.

- The vining crosses are at the F<sub>2</sub> stage.
- NE is reluctant to do marker work on F<sub>5</sub>, so the goal is F<sub>6</sub> lines for marker analysis. (NE had hoped to get funding with Ian Mackay, NIAB, to do multi-way crosses but the legume crosses were specifically excluded from funding by the BBSRC).

## **5. Seed quality crosses and their analysis (colour stability, TILLING) (CD)**

### **Colour stability**

- Two loci being followed: Lox variant, L-3, has been crossed with Kahuna and Princess. F<sub>2</sub> lines with L-3 Lox allele have been back-crossed to marrowfat parent and F<sub>2</sub> screened. Progeny seeds should be available to do bleaching experiment in greenhouse (possibly field).
- A new L-3/L-2 variant has been crossed with marrowfats (Princess, Samson, Kahuna), awaiting F<sub>2</sub> harvest. (This variant gives low activity of both bleaching and off-flavour Lox enzymes).
- Staygreen variants: two supergreen lines (JI 185, JI2621) were crossed with Princess and Kahuna.
- JI185 cross: Sgr<sup>+/-</sup> homozygous F<sub>3</sub> families identified in progeny (F<sub>4</sub> seeds). Marrowfat parent = sgr<sup>-</sup>. Seeds from homozygous families can be bulked for bleaching experiments.
- Backcross done into Princess background: BC1 F<sub>1</sub> sown.
- Crosses with second supergreen, JI 2621, are a nightmare (endless vegetative growth, extremely tall).

### **TILLING**

- Trypsin inhibitor mutants isolated in GLIP: a test case for manipulating seed quality using this technology. Lower activity mutants have been isolated but due to other background mutations affecting seed size and other characters, back-cross mutant lines are needed for meaningful comparisons.
- NE queried if additional seed quality gene alleles should now be sought using TILLING. KF said seed quality a high priority, at top with standing ability, and even higher than the latter now. NE queried if colour pathway genes could be targets. CD said that green cotyledon mutants have been identified in the phenotypic screen of the TILLING populations. Several genes in the seed colour degradation pathway are candidates for TILLING.

## **6. Downy mildew resistance: update (NE, JT)**

NE commented that some resistance to downy mildew has been found to segregate in the JI15 x JI1194 RILs. JT is currently working with these lines and hopes there will be enough seed to extend the analyses to more pathogen populations. This is necessary to determine whether the resistance is as broad as possible. CD reported that 15 x 1194 RILs are being bulked at JIC for seed for JT's experiments. The lines are also being bulked at NIAB, with the aim of trialling the whole population this year.

The 2007 microplot material should be looked at for downy mildew.

## **7. Genetic map information & feedback (NE)**

- NE reported that, after the last meeting, pre-publication map information was prepared and distributed to Birds Eye and Nickerson-Advanta, and is available to other PCGIN stakeholders on request.

- Discussions with Simon Berry (Nickerson-Advanta) concerning a multiplex marker system used at JIC had highlighted that the assay is based on <sup>33</sup>P detection, making it impractical at breeding stations, but the assay has recently been converted to a fluorescence assay (by Maggie Knox) and JIC is happy to exchange protocols with interested parties.
- Carol Moreau (JIC) is looking at parents of combining and vining pea populations and some markers are available.
- SK asked if the *Vicia faba* markers were on a global scale. NE said there was public access to a wide range through the EU project marker website (<http://bioweb.abc.hu/mt/pisprim>) but it was important to develop a set appropriate to the lines that would be used in PCGIN.
- Current data indicated that the level of SNP polymorphism on faba bean may be low, but this needs to be assessed for the PCGIN material.
- The JIC pea maps were found to be generally helpful to other members of the network.

#### 8. GL-TTP update (CD, NE)

GL-TTP will continue beyond the end of GLIP, without subscription payment. GL-TTP had been developed as a component of the EU project. The link between the project and the user community will continue to exist as a consortium. If other projects want to make use of it, they could try to find funding.

The new GL-TTP executive committee comprises Tom Warkentin (Canadian pulse breeder, who will visit JIC this Summer), Anne-Marie Bochard (Limagrain), Petr Smykal (Agritec) and Aleksander Mikic (Novi Sad), supported by Noel Ellis (JIC) as the ex officio ex-president.

#### 9. LINK proposal & taste/flavour metabolite genetics (CD, NE)

CD raised the possibility of building on work by Adrian Charlton (CSL, York) and JIC (presented at last stakeholder meeting, 10/07) as a LINK project with industrial involvement. The industry would provide the commercial materials and evaluation by taste panels. This work would focus on compounds implicated in taste and flavour in vining and marrowfat peas, in order to link the subjective measurement of quality scores to objective criteria. This would lead to establishing the genetic basis of variation in the relevant compounds and the selection of desirable lines in breeding programmes using markers. Metabolite analysis of some RILs has been carried within the PCGIN satellite project at CSL, including a set of wrinkled-seeded (vining) lines that could be evaluated for taste characteristics. (Additionally, some vining pea crosses are being set up within PCGIN).

There was general support for a LINK such as this one.

- BS said AB (PGRO) has extensive experience of LINK and can give advice.
- SK suggested contacting Premier Foods, Campbells and Pinguin Foods. KF offered to contact these and other possible BEPA contacts.
- Need to contact appropriate Defra person, depending on LINK. Peter Street is the contact for sustainable agriculture. However JT suggested David Cole - the Horticulture contact. (Mike Dole is the Food contact).
- NE said the subject should be neutral, so not necessarily horticulture.
- SK said that Mike Day has done work on taste at NIAB for many years.
- **CD to write a half page for initial discussions for KF to initiate.**

Depending on the LINK category, there are deadlines – three dates for 2008, so need to decide on submission date.

## 10. PCGIN continuation (& LISA)

Anthony Biddle (PGRO) was unable to attend but had sent an email in advance requesting that the meeting consider the possibility of PCGIN including lupin work under its umbrella beyond 2009 (CD email 10/1/08). AB thinks that PCGIN would be an ideal platform for lupins. AB was thanked for raising this. The lupin LINK project (LISA, looking at the agronomic practice and some genetics) is reaching its final year and BS provided some details. NE said that lupins can be used for fish-feed, lupin research is needed, and is being studied within GLIP. No lupin work is being carried out at Rothamsted now, but lupin work is being done in Europe and Australia. BS pointed out that lupins are used on the continent for feed more so than in UK.

- Other species can be included within the PCGIN portfolio. NE pointed out that, given the importance of pulses in rotations, lupins could provide an additional break to vining peas and faba bean.
- At the inception of PCGIN, we wished to include pea, fababean, lupin and clover. The relationship between PCGIN and lupin has remained tentative, and the inclusion of clover was not agreed by Defra, thus 'P' rather than 'L'.
- It was proposed that **a meeting between NE, AB and Michael Abberton, IGER**, be set up to establish what future work on lupin could be considered within PCGIN. It was emphasised (DO'S) that this should not diminish in any way the current effort on pea and bean. **AB will set up a meeting (BS to communicate this to AB)**.
- Following this, a meeting should take place with David Cooper.

MA said that Richard Weightman, ADAS, is organising an AAB meeting 'Improving Agriculture'. David Cooper, Defra, will talk about the 'GINs' and possibly about their future at this meeting in May. A new appointment is to be made within Defra for crops (no names yet).

## 11. Dates for next meetings & AOB

**Next PCGIN Management Meeting** – Wednesday 25<sup>th</sup> June 2008 at NIAB

**Cereals 2008** – 11<sup>th</sup> & 12<sup>th</sup> June 2008

**PGRO Open Day** – 17<sup>th</sup> June 2008

Noel Ellis proposed a vote of thanks for Keith Fox for hosting and deftly chairing the meeting.