

**MINUTES OF THE PCGIN MEETING HELD AT THE PGRO RESEARCH
STATION, THORNHAUGH ON FRIDAY 29TH SEPTEMBER 2006, COMMENCING
AT 11.00am**

Present:

PGRO Geoffrey Gent Chair a.m.
 Anthony Biddle
 Barrie Smith

JIC Noel Ellis
 Claire Domoney
 Mike Ambrose
 Catherine Chinoy
 Lynda Turner
 Trevor Wang
 Julie Hofer
 Carol Moreau

NIAB Jane Thomas Chair p.m.
 Simon Kightley
 Haidee Philpott
 Donal O'Sullivan

DEFRA Donal Murphy-Bokern

University of Julian Wiseman
Nottingham

Unilever Frances Bligh

Nickerson- Keith Fox
Advanta

GL-TTP Frederic Muel
 Catherine Golstein

Frontier Paul Brown + colleague

Wherry's Mervyn Pope

Danisco Lars Andersen

Rothamsted Toby Bruce
 Lesley Smart

Velcourt Keith Norman

Salvesen/
NFU Sarah Pettitt

SASA Tom Christie

Raynham Frank Oldfield
Farms

1. Apologies

These were received from: Angie Jackson, Frontier; Stephen Smith, Innoseeds; Peter Smith, Wherry & Sons; Adrian Charlton, CSL York and Nick Saunders, CCFRA.

2. Welcome and Introduction

Geoffrey Gent welcomed delegates to PGRO and said that he hoped there would be a full and open discussion through the meeting. He mentioned the contribution that had been made through Claire Domoney addressing a series of trade meetings and offering science based solutions to a number of the areas of concern following the 2005 and 2006 harvests. He then said that a number of presentations had been planned commencing with a brief talk from Claire introducing PCGIN and summarising progress to date.

3. PCGIN

Claire began by saying that we changed the meeting format from previous stakeholders' meetings and proposed to highlight individual tasks and activities rather than to give a comprehensive description of PCGIN activities as these are available at the PCGIN web site. PCGIN has six objectives and Claire reported good progress in each area. She referred to Mary Wade as the administrator for Objective 1 on communication and delivery and reported on the commercial contacts over the past year, listing some of the key interactions. With Objective 2, phenotyping, she reported on the plots grown at John Innes, NIAB and PGRO and how these had allowed the identification of a line with very erect habit. Objective 3, Performance, would be covered in more detail by Noel Ellis and Objective 4, Reverse Genetics, aimed at obtaining new knowledge of useful genetic traits, had identified a variant pea line having a 'bulbous base' to the stem, providing greater standing ability. Objective 5, Genetic Mapping, would also be covered in more detail by Noel Ellis, including details on access to the genetic markers required by breeders. Objective 6, Seed Quality, had considered a wide range of characteristics depending on the variety usage. Progress was reported on the identification of novel mutants in proteins of importance to animal feed quality and in enzymes likely to impact on bleaching of seed colour. Claire introduced the work at the University of Nottingham on seed quality for animal feed for poultry.

4. Feeding Studies

The Chairman then introduced Professor Julian Wiseman who discussed feeding studies with peas and emphasised the need to be financially competitive with other sources of vegetable protein. He reported that the great majority of poultry farmers were using soya-based feeds, but he noted the production of Extrupro which was based on a 50/50 mix of peas/beans and rape. He also discussed the amino acid content of peas, the importance of protein quality and, in particular, the impact of trypsin inhibitors. He mentioned that, with both pulses and cereals, often the animal

feeding use was the major market, but this had received relatively little attention from plant breeders and during varietal selection.

Unfortunately, Julian had to leave promptly following a brief discussion of his presentation.

5. Genetic Markers

This was followed by Noel Ellis who discussed the developments within PCGIN regarding the availability of agronomically relevant genetic markers. First he reported developments at the JIC. PCGIN and LIS websites that provided access to pea genetic marker information as had been requested at the previous stakeholders' meeting. He discussed this briefly in the context of emerging knowledge on comparative genomics in legumes. For the remainder of his presentation he discussed the method and implication of the selection of the three parents for the pea recombinant inbred lines that PCGIN is tasked with generating. The selection of these lines was in three phases: the first was the analysis of performance data for pea cultivars assessed at NIAB (undertaken by Haidee Philpott, NIAB); the second was accessing seed stocks of as many as possible of these cultivars (arranged by Mike Ambrose, JIC and Niall Green, SASA) and the third task was the collection and analysis of genotype data (Carol Moreau & N Ellis, JIC together with Mike Ambrose, JIC and Keith Fox, Nickerson-Advanta). This involved the identification of the four most discriminating traits which were: Downy Mildew sensitivity, standing ability, yield and protein content. Genetic marker analysis followed by principal components analysis highlighted the distinctness of cultivars from currently available recombinant inbred populations and allowed the identification of maximally distinct parents that also combined reasonable agronomic performance and contrasting trait behaviour. Subsequent analysis of the population structure of these marker data confirmed that the three selected lines were a good sample of the available genetic variation. Thus the parents chosen were likely to provide a good resource for the analysis of traits of importance to UK pea breeders. The possibility of repeating this process for faba bean and vining pea was discussed briefly.

Questions were invited after each presentation. Questions were raised on whether or not root biology was being studied, particularly in relation to drought resistance. It was pointed out that there is no direct focus on root biology, although information on drought resistance may come from the plot trials. Noel Ellis added that related work is identifying metabolites that are induced in drought-stressed pea plants.

Keith Norman drew attention to the reduction in pea yield where rape was also part of the rotation. This was discussed in the light of possible sulphur deficiency. Donal Murphy-Bokern added that this was unlikely to be a consequence of an S deficit as a consequence of the addition of S to the rapeseed crop.

The Chairman drew attention to the fact that currently all UK peas were traded for premium uses. This excluded their incorporation in feeds for their vegetable protein content. He said that copies of the September Pulses Marketing Update were available together with other PGRO publications.

The afternoon session was chaired by Jane Thomas who introduced Frederic Muel and invited him to present his paper on "Bruchids – the French experience" as this had been included in response to growers' requests. The paper was a continuation of

discussions at an earlier meeting held at PGRO in August (which Frederic was unable to attend) to address the recent upsurge in infestation of bean crops by bruchid beetles.

6. Bruchids

Frederic firstly gave an overview of pea and bean production in France. This showed a progressive decline in the pea area, but an increase in the area of beans. He reported that whilst pea and bean bruchids were present in France, the pea bruchid was still restricted to production areas in the south west of France and was more a pest of winter peas.

He then described a system of pest and crop monitoring that was in place for the control of bean bruchid which had given good results. This commenced with the recording of air temperatures. The first spray date (T1) coincided with a period of 2 consecutive days with max temperature of 20 degrees when the first pods were 2 cm long, followed by a second spray date (T2) 8 – 10 days later. Dates varied according to location and the T2 spray was timed according to the persistence of the chemical treatment. Endosulfan was the main product used, but this will be withdrawn after the '06 harvest. Trials are in hand to evaluate the effectiveness of alternative products and to look for genetic resistance to the pest. Information was given that showed differences in bruchid infestation for a range of breeding lines. Information was also presented on the parasitic wasp *Pholetesor pedias* and other factors affecting the appearance of beans. The usefulness of crop fumigation was also discussed. Overall there was confidence that the pest could be controlled providing the rules were followed for pest monitoring and spray dates.

(During the preceding evening, a detailed discussion on bruchid took place. Anthony Biddle outlined the LINK proposal which was in its final stage of preparation and he reported that tests would shortly commence to see if there was resistance within the bruchid populations to synthetic pyrethroids which have been used for many years on bean crops. A regional approach to pest control was advocated, but this would have to be planned by merchants looking for beans of suitable quality for export and managed by agronomists. The quality standards for bruchid infestation in broad beans were also discussed, with participants noting that these were appreciably higher than with field beans for export. Frank Oldfield gave details of the financial impact of the pest on broad bean producers and the very high level of risk that was linked to future production. Frederic Muel stated that using the best control measures that are available, the production of bruchid free beans in England should be possible.)

7. General Discussion

This was led by Mike Ambrose who introduced wide areas for discussion.

Mike informed on the current state of acquisition of *Vicia faba* (bean) germplasm and the information that was required to choose suitable parents for crossing.

With regard to seed bleaching, Anthony Biddle reported that samples harvested in 2006, a few days apart, showed remarkable differences in bleaching. Claire Domoney said this material would be useful for study, as the samples obtained recently from Askew & Barrett had been harvested at the same sites but in different years. Keith

Fox added that bleaching was also a sporadic problem in vining peas, giving rise to 'blondes'.

On the matter of working with vining peas, Geoffrey Gent introduced the additional costs and complexities with the production of 150 minute peas. He said that there were good reasons for minimizing the time between vining and processing, but if genetic changes could be introduced to vining peas that reduced deterioration and so added to harvesting flexibility, this would be most welcome.

Geoffrey also introduced the interest in peas for ensiling and said that whilst PGRO had relatively little contact with farmers undertaking this exercise, this seemed to be a successful additional use for the crop. Lars Andersen reported that most peas grown in Denmark were ensiled, often in an admixture with cereals. Here pea and barley are intercropped and used as silage for livestock.

The energy demand of agricultural systems was noted to be under current scrutiny and the role of legumes in reducing energy demand of rotations was noted. The US efforts by DOE in sequencing the soybean genome were also noted in this connection and there was some discussion of the unpredictable consequence for vegetable protein import of an increase in soybean usage as an energy crop in the Americas.

8. Future Plans

The genetics of bruchid resistance in pea was discussed in relation to future studies of variation in bean. The neoplastic pod and sources of pea seed resistance in *Pisum fulvum* identified by Australian and US workers were discussed, together with the approach taken through introducing an alpha-amylase inhibitor gene into pea that had been successful. Some work is planned at JIC to investigate variation in defensin genes, that contribute to bruchid resistance in mung bean. Donal O'Sullivan outlined a bid to be made to the BBSRC/Dfid call for project proposals.

The crop science initiative bid to study metabolite variation in relation to quality was discussed briefly. In rice and tomato, these approaches had been fruitful in identifying quality metabolites and corresponding gene markers.

9. Display of plants

During the break times in the meeting, there was an opportunity to view posters and plants relevant to the network. The plants included variants for plant architecture and examples of the neoplasms that contribute to the pod component of bruchid beetle resistance in pea.

Seed samples showing diversity and corresponding postcards were also available.

10. Concluding Comments

Geoffrey Gent thanked the speakers and said that Frederic Muel's contribution and linguistic skills were much appreciated. Claire Domoney, Jane Thomas and Noel Ellis said that Donal Murphy-Bokern's presence at the meeting was appreciated and suggested a vote of thanks to Defra.