



# QUANTITATIVE METHODS IN PLANT BREEDING

**A TWO WEEK COURSE**  
**11<sup>th</sup> March – 22<sup>th</sup> March 2013**

**Statistics, computation and data handling,  
molecular genetics, population genetics,  
quantitative genetics, linkage analysis, genomic  
selection, association mapping, marker assisted  
selection**

**Tutor: Dr Ian Mackay**

**THE NATIONAL INSTITUTE OF  
AGRICULTURAL BOTANY  
CAMBRIDGE**

[www.niab.com](http://www.niab.com)

## **Quantitative Methods In Plant Breeding**

This annual two week postgraduate level course, which we successfully ran for the first time in 2008, introduces participants to methods in quantitative genetics and statistics. Course content ranges from the well established, for example variety trial design and analysis, to more contemporary methods such as linkage disequilibrium mapping and genomic selection. Emphasis is on practical application of methods to breeding programmes with theory covered in sufficient depth to allow confident evaluation and application of methods to plant breeding programmes. The course provides an opportunity for participants to become familiar with the concepts and utilization of contemporary methods and software at all stages in the breeding process.

### **Who should attend?**

Plant breeders and plant geneticists who have some background knowledge of statistics and quantitative genetics, but who wish to understand and be able to apply these methods more thoroughly. Post-graduate students working on the detection and analysis of genes controlling the inheritance of complex traits.

The course is limited to 24 participants.

### **Course content**

Topics will include:

*Revision/refresher:* Basic statistics and genetics

*Statistics:* Regression, ANOVA, variety trial design and analysis

*Trial design and analysis:* Principles of good design, blocking, spatial analysis

*The mixed model:* Variance components, REML, BLUPs & BLUEs

*Molecular genetics:* Strengths and weaknesses of alternative marker systems

*Population genetics:* Single and multiple locus disequilibrium

*Quantitative genetics:* QTL, selection theory, genotype x environment interaction

*Linkage analysis:* Genetic maps, alternative mapping populations

*Association mapping:* Population structure and methods for its control

*Genomic selection:* Application in plant breeding

*Marker assisted selection:* Strengths, weaknesses, methods

## COURSE DETAILS

### Duration

Week 1: Monday 11<sup>th</sup> March– Friday 15<sup>th</sup> March 2013

Week 2: Monday 18<sup>th</sup> March– Friday 22<sup>nd</sup> March 2013

The course will start at 10.30 on Mondays and finish at 14.00 on Fridays to allow UK travel to and from Cambridge.

**What's included.** Course materials, refreshments, lunches, guest lectures, two local excursions, a pub meal on the Wednesday of week 1 and the course dinner on Thursday of week 2.

**Accommodation.** We have reserved 10 en-suite rooms inclusive of breakfast and internet access at Murray Edwards College, a short 10 minute walk from NIAB. If you wish to book one of these rooms you need to book and pay by **no later than 6<sup>th</sup> January 2013**. Note that cancellation charges on this accommodation apply – see details below. We allocate these rooms on a first come basis. We have other options for accommodation in Cambridge but cannot guarantee availability – please contact us for details.

### Cost - course registration only (no accommodation)

Postgraduate student - £756; others - £1244.

### Cost – course plus 8 nights accommodation in Murray Edwards College

Postgraduate student - £1512; others - £1995.

Note that overseas attendees will need to arrange additional UK accommodation before and after the course and for the intervening weekend. Extra nights at Murray Edwards College can be arranged at £88 per night via the booking form.

**Student Bursaries.** We have three £300 bursaries to offer students taking the course plus accommodation package. To apply for a bursary we require a CV, a description of your current project and a supporting letter from your supervisor.

**How to apply.** Complete and return the accompanying form to “Chris Dixon, NIAB, Huntingdon Road, Cambridge CB3 0LE, UK” or by fax on +44 1223 277602. **Please do not send bank or debit/credit card details by email.** The course is limited to 24 participants on a first come basis. The final closing date for applications without guaranteed accommodation is **28<sup>th</sup> February 2013**.

**Payment.** We can accept payment by debit/credit card and UK cheque. Contact us if you want to pay by card over the telephone. We also accept overseas bank transfers; contact us for details.

**Contact details.** Please address any queries to [courses@niab.com](mailto:courses@niab.com) or by telephone to Chris Dixon on +44 1223 342269.

**Cancellation charges.** Murray Edwards College policy is to levy a 20% administrative charge irrespective of whether or not they are able to re-sell the room. If they cannot re-sell the room they will levy the following; cancellation 2-4 months before the course, 75% of the total value of the booking increasing to 90% at 0-2 months before the course. We strongly recommend that you arrange insurance to cover your risk of cancellation.

Name		
Address		
Tel.	Fax	
E-mail		
<b>Package</b>		<b>Cost</b>
Student	Course only - £756	
Student	Course plus 8 nights accommodation - £1512	
Student	Do you wish to apply for a bursary? If yes, please provide the information requested	Yes/No*
Others	Course only - £1244	
Others	Course plus 8 nights accommodation - £1995	
Extra nights B&B at Murray Edwards College subject to availability. <b>Please provide dates:-</b>		£88/night
<b>Total</b>		
<b>Signature:</b>	<b>Date:</b>	

**Payment By cheque:** Please make cheques payable to “NIAB Ltd”

**By card** - Please tick type of and provide details

American Express  / MasterCard  / Visa  / Maestro  / Delta  / Solo

Name on Card \_\_\_\_\_

Card Number \_\_\_\_\_

Start Date \_\_\_/\_\_\_/\_\_\_ Expiry Date \_\_\_/\_\_\_/\_\_\_ Issue No. (Maestro/Solo ONLY) \_\_\_\_\_

Last 3 digits on signature strip on reverse of card (**compulsory field**) \_\_\_\_\_



\*If you are applying for a bursary, please send in your application and booking form asap. We will then contact you to confirm the outcome of your application. You need not pay anything until you have had this confirmation.