

TRAINING REPORT

Quantitative Methods in Plant Breeding



The NIAB Quantitative Methods in Plant Breeding (QMPB) course was held in the College of Agriculture at Punjab Agricultural University (PAU), India from Monday 29th to Friday 2nd September, 2016. The workshop was a joint initiative of the recently funded Indo-UK Centre for Improvement of Nitrogen Use Efficiency in Wheat (INEW) and the Cambridge-India Network for Translational Research in Nitrogen (CINTRIN) projects both funded through the Newton Fund via the UK-India Virtual Joint Centres (VJCs) for Agricultural Nitrogen by the Biological and Biotechnological Sciences Research Council (BBSRC) in the UK and the Department of Biotechnology (DBT) in India.

The 26 Quantitative Methods in Plant Breeding course participants along with course tutors Drs Ian Mackay and Alison Bentley together with local organisers Drs Parveen Chhuneja and Dharminder Bhatia and CINTRIN partners Drs Rajeev Gupta (ICRISAT) and Manoj Prasad (NIPGR, Dehli)

The 26 course participants were selected from 81 applications and represented the Indian INEW and CINTRIN partner institutes (PAU: 8 participants), Borlaug Institute for South Asia (BISA; 1 participant), Indian Institute of Wheat and Barley Research (IIWBR; 2 participants), Indian Agricultural Research Institute (IARI; 2 participants), National Bureau of Plant Genetic Resources (NBPGR; 1 participant), National Institute of Plant Genome Research (NIPGR; 3 participants), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT; 3 participants) as well as two UK INEW centres (Rothamsted Research (1 participant) and The University of Nottingham (1 participant)). Additional participants working in areas complementary to the research areas in the VJCs were selected from CIMMYT, Hyderabad (1 participant), G.B. Pant University of Agriculture and Technology, Pantnagar (1 participant), Indian Council of Agriculture Research, Karnal (1 participant) and private breeding company Bioseed Research India (1 participant).

The course was officially opened by the Head of the Department of Plant Breeding and Genetics, Dr Karanjit Singh Thind followed by an introductory welcome from renowned PAU quantitative geneticist Dr GS Chandal. The course content was delivered through lectures and practical sessions adapted from the annual two-week NIAB QMPB course to cover basic statistics and quantitative genetics, trial design and analysis, population genetics, genetic mapping and genomic selection. The computer-based practical sessions included the use of R/Studio for trial design, and conducting statistical and experimental analyses, population genetics software DARwin and Flapjack, QTL mapping in R/QTL, genome-wide association mapping in GWASpoly and genomic selection using the package ‘penalized’.

On Tuesday evening an official dinner, hosted by the Vice Chancellor of PAU Dr Baldev Singh Dillon was held for Drs Ian Mackay and Alison Bentley and the CINTRIN PIs Drs Rajeev Gupta (ICRISAT), Manoj Prasad (NIPGR). The dinner was also attend by PAU’s Head of Research. All of the PAU officials were extremely supportive of the training course being held at PAU and encouraged further interaction with UK partners.



Above: Course participants hard at work during practical sessions

Left: Ian Mackay and Alison Bentley with PAU VC Dr Baldev Singh Dillon



On Wednesday afternoon a field trip was arranged to visit INEW partners at BISA. This included a (very humid) tour of the field trials including demonstrations of precision and conservation agriculture in wheat, rice and maize systems and equipment demonstrations followed by tea and enthusiastic discussions with BISA staff. A social evening event was also held on Wednesday for all participants at a local restaurant. This was a very enjoyable evening and a great opportunity for more informal networking and discussions between the course participants.



Above: Dr HS Sidhu from BISA explains precision cropping system research to the QMPB PAU participants.
Below: Participants celebrating the half way point of the course at the social evening.



The course feedback was collected on the final day and covered the pace of delivery, course content, clarity of lectures, time allocation between lectures and practicals, access to sufficient information and general comments. All of the participants agreed that the pace and content were good, with two requesting additional explanation of some of the underlying statistics. All participants commented that the lectures were clear and all but two participants thought that the split between practical and lectures was ideal (the other two requested longer for the practicals). Overall, the participants felt they had all of the information that they needed to get started and that they hope to continue with their learning in this area following the course. The general comments received were extremely positive with 10 of the participants suggesting that the course should be extended (to a week to 30 days!) to cover topics in more depth.

Overall, the course was a great success and was very enthusiastically supported by all of the participants, local organisers and PAU officials. All of the participants were engaged and keen to learn and very grateful for the opportunity to attend the course. There was also a lot of networking between attendees and no doubt many future collaborations will begin as a result.