“Decoding the Wheat Genome”
Professor Keith Edwards
The Cereal Functional Genome Group, Bristol University

Professor Edwards started by posing the intriguing question “What has the Wheat Genome to do with the price of bread? “As a major global crop, wheat will increase in price over the next 20 years, unless yields are also increased to meet the demand from the growth in world population. Although the Green Revolution of the second half of the 20th century has increased yields dramatically by using fertilisers, herbicides, pesticides and semi-dwarf wheat, this cannot sustain future world populations and yields will fall far short of the 40-50% increase that is needed by 2030.

Without another green revolution global food security will be endangered, leading to shortages and soaring bread prices. The way forward will be by using the newer technologies of genetic modification (GM) and the exploitation of natural plant variation. The speaker described how the latter approach was being exploited by using a whole genome, high speed DNA sequencing approach. This has already permitted the derivation of 20,000 defined molecular markers amongst 89,000 wheat genes that can assist plant breeders worldwide to identify quickly those genes involved in yield determining traits (e.g. seed growth, disease and drought resistance and salt tolerance). Professor Edwards showed how these markers could be derived through computer aided sequencing analysis performed using DNA from major wheat markers hybridised to standard capture genomic DNA on a single slide to identify important variable sequences.*

The power of these techniques was down to the outstanding advances in the speed and accuracy of DNA sequencing. Whole species of genomes can be sequenced in hours whereas a year ago it took months. Professor Edwards concluded on an optimistic note that using these methods we could get to the 40-50% increase in yield by 2030.

Given on Wednesday 9th May 1012 at the Royal Agricultural College

*For details see the University of Bristol website http://www.cerealsdb.uk.net/