

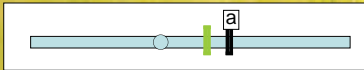
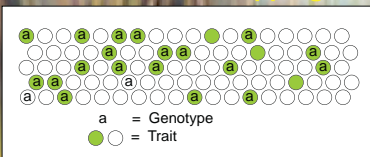
Genomics-assisted Analysis and Exploitation of Barley Diversity (EXBARDIV)

Xin Xu¹, Thien Ho¹, Naeem Syed¹, Marc Moragues¹, Andy Flavell¹, Bill Thomas², Jordi Comadran², Joanne Russell², David Marshall², Robbie Waugh², A Tondelli³, L Cattivelli³, F Schnaithmann⁴, K Pillen⁴, A Schulman⁵, C Ingvarsdottir⁶, S Rasmussen⁶, R Sharma⁷, B Kilian⁷
¹ Division of Plant Sciences, University of Dundee at SCRI, Invergowrie, Dundee, UK. ² Scottish Crop Research Institute, Invergowrie, Dundee, UK. ³ CRA – Genomic Research Centre, Fiorenzuola d'Arda, Italy. ⁴ Martin-Luther University of Halle, Germany. ⁵ MTT/University of Helsinki, Finland. ⁶ Faculty of Life Science, University of Copenhagen, Denmark. ⁷ IPK Gatersleben, Germany. ^a Division of Plant Sciences, University of Dundee at SCRI, Invergowrie, Scotland. ^b SCRI, Invergowrie, Scotland.

Project Goal

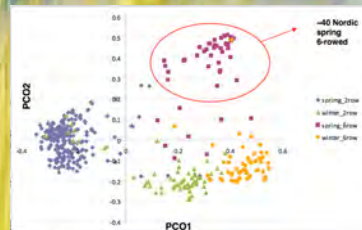
To establish an incremental association mapping approach based on different population types for the discovery of new gene alleles in barley which can be exploited for crop breeding.

Association mapping

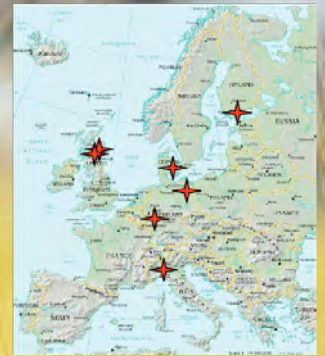


A strong association between a trait and a marker implies a close physical linkage in the genome (IF the population of individuals is unstructured)

Population structure of the *Hordeum vulgare* cultivar collection (Illumina SNPs)



The EXBARDIV Consortium



Andy Flavell, University of Dundee at SCRI
 Klaus Pillen, Max Planck Institute, Koln
 Alan Schulman, MTT Agrifood Helsinki
 Andreas Graner, IPK Gatersleben
 Luigi Cattivelli, CRA Fiorenzuola
 Søren Rasmussen, Copenhagen University
 Joanne Russell, Scottish Crop Research Inst.



Traits being measured

Field Plot Data	Seed yield parameters	Seed Content	Plant Parameters	Biotic Stress	Abiotic Stress
Frost	Grain Number (seeds/ear)	Grain protein	Above ground biomass	Powdery mildew resistance	Frost tolerance, Fv/Fm value after freezing
Heading	Grain yield (weight/area)	Grain total - P1	Above ground N content at maturity	Leaf rust resistance	
Height	1000 kernel weight	Grain phytates	Leaf N content during shooting & flowering	Net blotch resistance	
Ear length	Grain area (X x Y)	Grain (p-glucan)		Leaf stripe resistance	
Maturity	Grain shape (width/length)	Grain N content		Rhynchosporium resistance	
Lodging	Grain hardness	Grain micro nutrients			
Leaning	Grain volume (X x Y x Z)	Grain starch content			
Braking		Arabinoxylan content			
Necking		Starch digestibility			
PC01N		Starch amylose			
PC01M		Starch amylopectin			
PC01L		Blue value			
PC01S					
PC01D					
PC01H					
PC01A					
PC01B					
PC01C					
PC01E					
PC01F					
PC01G					
PC01I					
PC01J					
PC01K					
PC01L					
PC01M					
PC01N					
PC01O					
PC01P					
PC01Q					
PC01R					
PC01S					
PC01T					
PC01U					
PC01V					
PC01W					
PC01X					
PC01Y					
PC01Z					
PC01AA					
PC01AB					
PC01AC					
PC01AD					
PC01AE					
PC01AF					
PC01AG					
PC01AH					
PC01AI					
PC01AJ					
PC01AK					
PC01AL					
PC01AM					
PC01AN					
PC01AO					
PC01AP					
PC01AQ					
PC01AR					
PC01AS					
PC01AT					
PC01AU					
PC01AV					
PC01AW					
PC01AX					
PC01AY					
PC01AZ					
PC01BA					
PC01BB					
PC01BC					
PC01BD					
PC01BE					
PC01BF					
PC01BG					
PC01BH					
PC01BI					
PC01BJ					
PC01BK					
PC01BL					
PC01BM					
PC01BN					
PC01BO					
PC01BP					
PC01BQ					
PC01BR					
PC01BS					
PC01BT					
PC01BU					
PC01BV					
PC01BW					
PC01BX					
PC01BY					
PC01BZ					
PC01CA					
PC01CB					
PC01CC					
PC01CD					
PC01CE					
PC01CF					
PC01CG					
PC01CH					
PC01CI					
PC01CJ					
PC01CK					
PC01CL					
PC01CM					
PC01CN					
PC01CO					
PC01CP					
PC01CQ					
PC01CR					
PC01CS					
PC01CT					
PC01CU					
PC01CV					
PC01CW					
PC01CX					
PC01CY					
PC01CZ					
PC01DA					
PC01DB					
PC01DC					
PC01DD					
PC01DE					
PC01DF					
PC01DG					
PC01DH					
PC01DI					
PC01DJ					
PC01DK					
PC01DL					
PC01DM					
PC01DN					
PC01DO					
PC01DP					
PC01DQ					
PC01DR					
PC01DS					
PC01DT					
PC01DU					
PC01DV					
PC01DW					
PC01DX					
PC01DY					
PC01DZ					
PC01EA					
PC01EB					
PC01EC					
PC01ED					
PC01EE					
PC01EF					
PC01EG					
PC01EH					
PC01EI					
PC01EJ					
PC01EK					
PC01EL					
PC01EM					
PC01EN					
PC01EO					
PC01EP					
PC01EQ					
PC01ER					
PC01ES					
PC01ET					
PC01EU					
PC01EV					
PC01EW					
PC01EX					
PC01EY					
PC01EZ					
PC01FA					
PC01FB					
PC01FC					
PC01FD					
PC01FE					
PC01FF					
PC01FG					
PC01FH					
PC01FI					
PC01FJ					
PC01FK					
PC01FL					
PC01FM					
PC01FN					
PC01FO					
PC01FP					
PC01FQ					
PC01FR					
PC01FS					
PC01FT					
PC01FU					
PC01FV					
PC01FW					
PC01FX					
PC01FY					
PC01FZ					
PC01GA					
PC01GB					
PC01GC					
PC01GD					
PC01GE					
PC01GF					
PC01GG					
PC01GH					
PC01GI					
PC01GJ					
PC01GK					
PC01GL					
PC01GM					
PC01GN					
PC01GO					
PC01GP					
PC01GQ					
PC01GR					
PC01GS					
PC01GT					
PC01GU					
PC01GV					
PC01GW					
PC01GX					
PC01GY					
PC01GZ					
PC01HA					
PC01HB					
PC01HC					
PC01HD					
PC01HE					
PC01HF					
PC01HG					
PC01HH					
PC01HI					
PC01HJ					
PC01HK					
PC01HL					
PC01HM					
PC01HN					
PC01HO					
PC01HP					
PC01HQ					
PC01HR					
PC01HS					
PC01HT					
PC01HU					
PC01HV					
PC01HW					
PC01HX					
PC01HY					
PC01HZ					
PC01IA					
PC01IB					
PC01IC					
PC01ID					
PC01IE					
PC01IF					
PC01IG					
PC01IH					