



Action FA0604: Triticeae genomics for the advancement of essential European crops

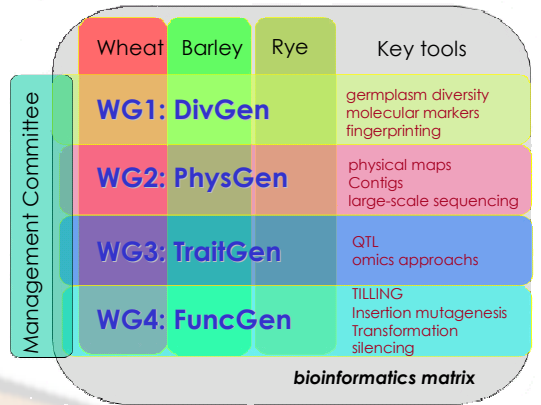
TritiGen <http://tritigen.ari.gov.cy/>

Europe faces the challenge of delivering safe, high-quality, and health-promoting food and feed as well as bio-products in an economical, environmentally sensitive, and sustainable manner across environments that face climatic change and increasing abiotic and biotic stresses. Triticeae cereals (wheat, barley and rye) are essential in human and domestic animal nutrition and are arguably the most important crops for European agriculture. Existing germplasm resources and current breeding methods alone are insufficient for understanding the mechanisms underlying important traits and for catalysing a quantum leap in yield, sustainability and quality improvement. Major advances in crops will require a broad suite of direct genomics approaches, built on relevant data from model plants (rice, *Brachypodium*). Such a strategy is massively complex and can only be carried out efficiently at the international level. The COST Action will coordinate, focus and strengthen national and pan-European Triticeae genomics to improve sustainability and value of the crops.

For more information on this COST Action programme see <http://tritigen.ari.gov.cy/>

Organization

The TritiGen COST Action, is organised into four interactive Working Groups (WGs). They will serve to coordinate research by the COST Action participants on the topics included under the WG. Their pattern of interaction and synergy is shown below, where they are also labelled by their acronyms.



Working Group 1. Tools for assessing, harvesting and applying genetic diversity (DivGen). Karl Schmid (Chair) and Hikmet Budak (Vice-Chair).

Development and deployment of more rapid and robust, less expensive, and denser molecular markers in order to assess germplasm diversity, phylogeographic patterns of diversity and haplotype, marker-assisted selection, association genetics and genome evolution studies.

Working Group 2. Accessing the physical genome for sustainability and quality (PhysGen). Pierre Sourdille (Chair) and Nils Stein (Vice-Chair).

Development of contig-based physical maps for barley and hexaploid wheat genomes that will serve as the basic resources for high-throughput gene isolation and large-scale sequencing. The overall synteny and colinearity of the Triticeae genomes and the sequenced genomes of rice and *Brachypodium* will be exploited.

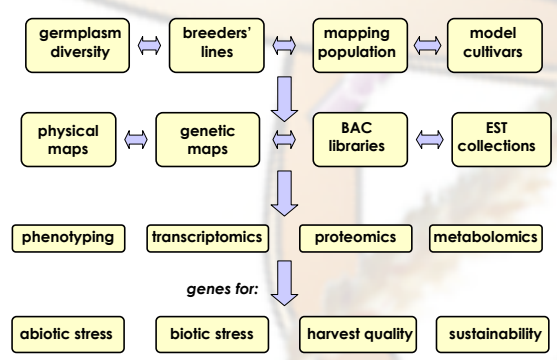
Working Group 3. Implementation of genomics approaches for understanding cereal traits (TraitGen). Nils Rostoks (Chair) and Hilde-Gunn Opsahl-Sorteberg (Vice-Chair).

Technologies to identify differentially expressed genes and to analyse gene expression levels on a genomic scale and proteomics tools will be used to better understand traits of interest in the Triticeae that control the sustainability and value of the crop.

Objectives

The main objective of this Action is to develop the technology platforms and projects that will provide efficient tools to identify and exploit qualitative and QTL alleles for improving wheat, barley and rye.

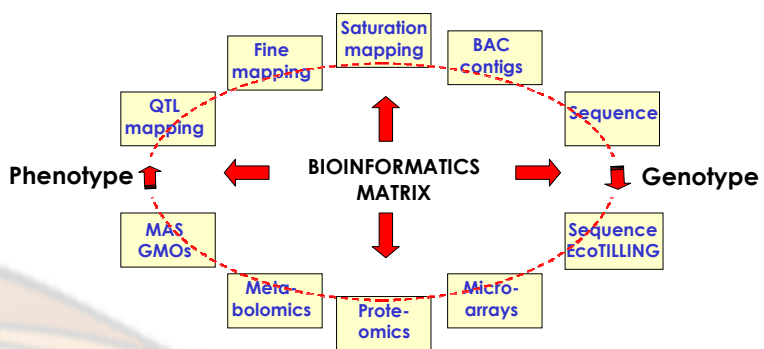
Research tools



Working Group 4. Functional genomics for testing and validation of candidate genes (FuncGen). Søren Rasmussen (Chair) and Patrizia Galeffi (Vice-Chair).

In order to assess gene function, RNAi and VIG strategies, transient and stable transformation, TILLING populations for reverse genetics, and SNP association mapping will be used. Advances in Triticeae transformation by partners in TritiGen is also making possible insertional mutagenesis strategies applying T-DNA and transposons.

Dissemination. Roberto Tuberosa (Chair) and Alain Murigneux (Vice-Chair).



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