



## Tomato Phenomics Web Project

**Raskind, A.<sup>1</sup>, Gur, A.<sup>2</sup>, Sobolev, V.<sup>1</sup>, Zamir, D.<sup>2</sup> and Edelman, M.<sup>1</sup>**

<sup>1</sup>Dept. of Plant Sciences, Weizmann Institute of Science

<sup>2</sup>Dept. of Field Crops, Vegetables and Genetics, Faculty of Agriculture, Hebrew University of Jerusalem

Phenomics may be described as the integrated informatics study of phenotypic and genotypic information to better understand the complex relationship between the two. This relationship often involves a complex network of gene interactions and quantitative trait loci that considerably hinders the use of classical genetic approaches. Integration of phenotypic and genomic analyses may provide important clues for understanding the flow of information from genome to phenotype. During the last few years, the Israeli Tomato Genome Project has generated a significant amount of data concerning different aspects of tomato biology. The current bioinformatics project aims at introducing the phenomics concept into tomato genomic research. Our goal is a public web-based tool that will facilitate data mining and experimental design by combining genetic, phenotypic, biochemical and physiological data in a single relational database.

Our work concentrates on analysis and presentation of phenotypic data and linking them to the existing genomic resources. This includes web-based tools for statistical analysis of experimental data and mapping of Quantitative Trait Loci. Currently, the system works with a dataset from tomato introgression lines and allows performance of the following operations: comparison of different genotypes for a given quantitative trait; analysis of quantitative trait variation within the whole population; quantitative trait profiling

of genotype (comparison of all measured quantitative traits to the parental cultivar); analysis of correlation between the traits in different years and environments.

Selection of input data and form of output are highly customisable. The user may create a custom sub-list of genotypes to work on. Analysis of results can be viewed in graphic and tabular formats. Publication quality graphics (PDF) and printer-friendly versions of the tables are built into the system. The system is founded on high-quality public-domain software. The combination of an Apache web server, PHP server scripting language and MySQL relational database server provides the means for building a dynamic database-driven interactive web site. It also readily allows inclusion of additional modules as the need develops (discussion forums, message boards, protocol books, etc). Statistical analysis is performed by R-package ([www.r-project.org](http://www.r-project.org)), an extensive and expanding set of analysis tools in combination with elaborate graphic capabilities. We are currently developing the following capabilities for the system: mapping of QTLs to chromosomes; data submission system; integration of data from mutagenesis experiments; additional options for statistical analysis; repository of relevant methods and protocols.

website: <http://bioinfo2.weizmann.ac.il:8080/tomato/PHP/index.php>