Proceedings of the 50th Italian Society of Agricultural Genetics Annual Congress
Ischia, Italy – 10/14 September, 2006
ISBN 88-**900622-7-4**

Poster Abstract – B.19

COMPLEX TRAITS ANALYSIS OF METABOLIC NETWORKS INVOLVED IN NUTRITIONAL AND ORGANOLETIC TOMATO QUALITY

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tomato, quality traits, biochemical parameters, large data set, correlation analysis

Italy is one of the most important suppliers of tomato products in the world and is fundamental that our productions can satisfy consumer requests for higher quality and healthy food, which would to preserve environmental and public health. In fact, tomato contributes significantly to human dietary intake of antioxidant compounds, vitamins and essential minerals, although recent criticisms of tomato quality have encouraged efforts to further improve it...Among the chief quality targets of tomato, are nutritional value and taste of the fruit. Breeding strategies aimed to improve these targets require a definition of the major parameters that contribute to their definition and quantification. At his purpose, it is important to identify the most important metabolites to be analyzed.. Technological developments have considerably extended our ability to describe complex biological systems, facilitating the analysis of metabolites, even though the interpretation of large genomic data sets obtained through the implementation of these technologies is troublesome.

In order to explore the genetic basis of tomato fruit biochemistry, in the present work we have used a high-throughput metabolite profiling protocol, and we have performed whole-plant phenotype characterization and sensory analyses. We phenotyped 38 tomato breeding lines for important nutritional traits and 6 traditional Italian ecotypes of tomatoes for taste attributes.

In particular, the tomato accessions were grown in the open field and were analysed for agronomic, biochemical and molecular traits. On ripe fruits sugar, organic acid content, carotenoids, vitamins, total phenolic were determined through HPLC and spectrometry analysis. In addition, considering that tomato fruit is rich of free aminoacids a Maldi-TOF analysis was carried out for their quantification. An index of nutritional quality of tomatoes based on the antioxidant content was developed to evaluate the antioxidant component of tomatoes. On traditional Italian ecotypes, besides agronomic, molecular and biochemical analyses, a sensory evaluation was also performed through a panel taste. Analysis of variance (ANOVA) was performed on data at a significance level of $P<0.05$, to compare compounds determining quality of fruit and a Pearson correlation analysis for all possible spectrum of combinations among metabolites, agronomic traits and/or sensory attributes was also applied. Moreover, a PCA approach was carried out to establish metabolic determinants of tomato taste. The phenotypic characterization is being integrated in a cartographic network based on correlation analysis that reveals the associations between phenotype and independent metabolic, including links with metabolites of nutritional and organoleptic importance. In fact, t it is really difficult to display such a large data set in a truly quantitative manner. In the future, we will analyze the correlation network to obtain a less cursory

discrimination of which traits are highly associated by using an algorithm that identifies functional modules within complex networks and thereby simplifies their interpretation.