

## **HIDRAS: AN INTEGRATED EUROPEAN PROJECT ADOPTING A PEDIGREE BASED APPROACH TO INVESTIGATE APPLE FRUIT QUALITY TRAITS**

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Just over four years ago, an EU-funded research project named HiDRAS was launched to tackle the challenging task of unraveling the genetic factors determining apple fruit quality. An innovative approach based on the integrated analysis of a diverse set of genetically related individuals (cultivars, breeding selections and medium to small progenies) representing the major founders of European breeding programs, was proposed.

At that time the number of molecular markers to completely cover the apple genome was insufficient, software tools to perform integrated analysis on multiple pedigreed plant populations were not available and, last but not least, it was the first time that such a massive phenotyping and genotyping effort was shared between 14 different European institutions.

In total, around 2000 individuals have been genotyped and phenotyped for a series of fruit quality traits during at least two seasons. Genes differentially expressed during fruit development and maturation have been identified and candidate genes have been positioned on a molecular linkage map. Consumer tests have been conducted in several countries, with the aim of assessing consumer preferences and to improve consumer perception about scientific research. Moreover, a database (AppleBreed DB) has been built to store and make the large amount of collected data, easy

to access and mine. Now, four years later, we are proud to show the results obtained, the tools developed during the course of the project and the potential that such an approach offers for QTL mapping in apple as well as in other Rosaceae crops. The identification of QTL alleles in a wide range of genetic backgrounds makes it likely that the generated markers be useful in marker-assisted breeding for fruit quality. The realization of such a large project has been possible thanks to the close collaboration between the research groups and breeding stations involved in the project and to the dedication of each participant to the achievement of the planned goals. An overview of the project structure and main results will be presented and discussed.