

## Phenotypes of AGAMOUS2-RNAi galaxy apple flowers

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With the goal of developing an ornamental apple with polypetalous flowers, AGAMOUS2 (AG2) (MdMADS15) was silenced by RNAi in several lines of *Malus pumila* Miller cv. Galaxy. Grafted AG2-RNAi Galaxy plants were grown in a greenhouse and began flowering five years after transformation, with seven transformed lines flowering in the 6th year. The C- Class gene function was altered, with phenotype varying among the transformed lines. Four lines had a strong phenotype with no stamens and 22-24 petals; the shape of locules was irregular, with an increased number of ovules per carpel. The number of petals in the AG2-RNAi Galaxy flowers was 19-25 petals vs. 5 in the non-transformed Galaxy flower. The number of ovules increased from 10 in the non-transformed Galaxy flower to as many as 16 in the AG2-RNAi Galaxy flowers. The phenotype was not altered in two AG2-RNAi Galaxy lines. These results add to our understanding of regulation of floral development in apple, and may lead to development of polypetalous ornamental apple cultivars.

## Odour profiling of apple cultivars and correlation with volatile compounds

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We are using a trained sensory panel to define the sensory attributes profile of a wide number of apple commercial cultivars and new selections under evaluation at FEM (Fondazione Edmund Mach). The same fruit are evaluated through instrumental determinations as well. Here we present the correlations found between perceived odours (by trained panel) and volatile compounds (by SPME-GC-MS) in 18 apple cultivars.

It is known that perceived odours are mainly the result of mixture of odorants (more than 300 compounds that can contribute to apple odour and flavour have been identified) and the single components of a mixture may lose their individual identity and a new mixture with a specific odour quality could emerge.

Thus the correlations between odours and volatile compounds in apples were investigated by a multivariate approach. Regression models allowed the identification of compounds highly contributing to the odours arising from the complex mixture of volatile compounds released by apples. For example acetate esters strongly contribute to different fruity attributes and the results suggest that perceived odours are due to the relative proportions among esters rather than their presence/absence.

In conclusion, sensory and instrumental profiling in combination with appropriate chemometric analyses can help to elucidate the relationships between the perceived odours in real food and the complex mixture of released volatile compounds.

### **Domestication bottleneck as a signature of history diffusion of apricot species**

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Domestication generally implies a loss of diversity in crop species relative to their wild ancestors because of genetic drift through bottleneck effects. The comparison of genetic diversity in Mediterranean areas was assessed. 207 native apricot accessions representatives of the local variability from different Mediterranean countries: Algeria, France, Italy, Morocco, Spain, Tunisia and Turkey in each country were selected excluding those issued from breeding programs. This material was analysed for genetic diversity and structure using a common set of 25 monolocus microsatellites distributed throughout the *Prunus* genome. According to the geographic origin of the material and using a model-based clustering method, four main gene pools were revealed, namely 'Irano-Caucasian', 'North Mediterranean Basin', 'South Mediterranean Basin', and a more transversal one named 'Adapted Diversity'. A significant gradient of decreasing diversity and allelic richness from the east to the south-west of the Mediterranean Basin was highlighted. Overall, results suggested that from the Irano-Caucasian area, apricot was introduced into the Mediterranean Basin through at least two different routes: the first one through the South of Europe and the second one through the North Africa. On the present bases relevant elements have been obtained useful for future management of apricot genetic resources as well as for genetic selection programs related to adaptive traits.