Auxin signalling and Fruit development

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The making of a fruit is a developmental process unique to plants involving a complex network of interacting genes and signaling pathways. In fleshy fruits, it involves three main stages (a) fruit set, (b) fruit enlargement, and (c) fruit ripening each corresponding to a transition step associated to major metabolic reorientations and structural changes. While the role of single hormones in these developmental shifts is now well established, the triggering of these processes is likely to be under a multi-hormonal control. The onset of ovary development into fruit is naturally triggered by successful pollination of the flower, yet, the signals driving the fruit growth following fertilization are not clearly understood, though the involvement of auxin and GA is well documented.

We study the role of auxin signalling master mediators: ARF, AUX/IAA and Topless transcription factors in fruit development using reverse genetics, single cell, RNA-Seq, ChIP-Seq and bioinformatic approaches.

Liste of publications related to the project:

Hao Y., Hu G., Breitel D., Liu M., Mila I., Frasse P., Aharoni A., Bouzayen M. and Zouine M. (2015) Auxin Response Factor SlARF2 Is an Essential Component of the Regulatory Mechanism Controlling Fruit Ripening in Tomato. PLoS Genet Dec 30;11(12):e1005649. doi: 10.1371/journal.pgen.1005649. eCollection 2015.

Breitel D, Chappell-Maor, Sagit Meir L, Panizel I, Pons Puig C, Hao Y, Yifhar T, Yasuor H, Zouine M, Bouzayen M, Granell Richart A, Rogachev I and Aharoni A. (2016) AUXIN RESPONSE FACTOR 2 Intersects Hormonal Signals in the Regulation of Tomato Fruit Ripening. PLoS Genet (in press).

Mazzucato A, Cellini F, Bouzayen M, Zouine M, Mila I, Minoia S, Petrozza A, Picarella ME, Ruiu F, Carriero F (2015) A TILLING allele of the tomato Aux/IAA9 gene offers new insights into fruit set mechanisms and perspectives for breeding seedless tomatoes. **Plant Breeding** 35:22

Hao Y, Wang X, Li X, Bassa C, Mila I, Audran C, Maza E, Li Z, Bouzayen M, van der Rest B, Zouine M (2014) Genome-wide Identification, phylogenetic analysis, expression profiling and protein-protein interaction properties of the TOPLESS gene family members in tomato. Journal of Experimental Botany 65:1013-23

Zouine M, Fu Y, Chateigner-Boutin AL, Mila I, Frasse P, Wang H, Audran C, Roustan JP, Bouzayen M (2014) Characterization of the tomato ARF gene family uncovers a multi-levels post-transcriptional regulation including alternative splicing. **PLoS ONE** 9, e84203

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Audran-Delalande C, Bassa C, Mila I, Regad F, Zouine M, Bouzayen M (2012) Genome-wide identification, functional analysis and expression profiling of the Aux/IAA gene family in tomato. **Plant Cell Physiology** 53:659-672

Wang H, Schauer N, Usadel B, Frasse P, Zouine M, Hernould M, Latche A, Pech JC, Fernie AR, Bouzayen M (2009) Regulatory features underlying pollination-dependent and -independent tomato fruit set revealed by transcript and primary metabolite profiling. Plant Cell 21:1428-1452