Line 1 – Plants biodiversity, Evolution and systematics

Line 3 – Support to plant research

Regulation of fruit development and ripening

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Project description

Fleshy fruits are edible structures that help seed dispersal. As any type of fruit, at the early phases of their development, they protect the seed(s) they contain. Seed and fruit development does not always proceed with the same pace, but usually fleshy fruits ripen when the contained seeds are ready for dispersal. Fruit development starts soon after pollination. In the early phases, fruit growth depends on cell division; later, mainly on cell distension. Once seed development is completed, usually the fruit ceases its growth and undergoes ripening. Ripening is controlled by endogenous and environmental factors. Factors controlling fruit ripening vary according to the species, as their origin is polyphyletic. Nonetheless, common regulatory factors, as the balance of hormones and changes in expression of transcription factors, have been described in several species. Ethylene is a key player in the regulation of climacteric fruit (i.e. those that use ethylene to start ripening). Its synthesis is under genetic and environmental control. Much is known in model species as tomato, but the models explaining tomato ripening do not work properly with other species, even if they are climacteric as peach. Our current activities are mainly focused on peach ripening to:

1) characterize the function of transcription factors during ripening;
2) characterize the function of genes encoding secreted hormone peptides.
3) characterize the regulation of the synthesis of those hormones stimulating or repressing ripening.

Heterologous expression in model species as tomato, Arabidopsis and tobacco is used to functionally characterize candidate genes.

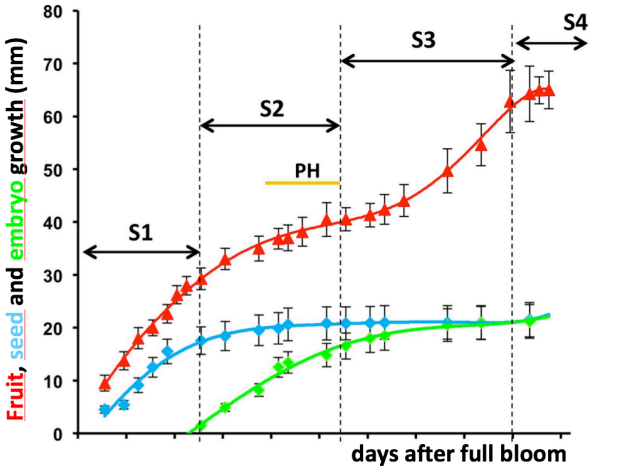

Figura 1 Peach fruit development from bloom to ripening. Fruit growth (red) is expressed as cross diameter while length is used for seed (blue) and embryo (green) development. PH: pit hardening.

Tadiello A, Ziosi V, Negri AS, Noferini M, Fiori G, Busatto N, Espen L, Costa G, Trainotti L. 2016. On the role of ethylene, auxin and a GOLVEN-like peptide hormone in the regulation of peach ripening. BMC Plant Biology **16**, 44.

Figure 2 Peach developmental stages from bloom to ripening, which occurs at S4. Fruit growth (red) is expressed as cross diameter while length is used *Figu*for seed (blue) and embryo (green) development. PH: pit hardening.