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Oral Communication Abstract – 6.08

THE BUD PEACH DORMANCY DILEMMA

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transcriptome, methylome, histone modifications, photoperiod, hormones

Fruit trees as well as other deciduous trees living in the temperate zone synchronize their development cycle following a circannual clock in which active and not active (or less active) phases are alternated. Several researchers have proposed definitions with the goal of making clearer the role of not active phase in specific plants organs, such as seed and buds. The most used definition of not active phase for buds is dormancy in Lang's meaning: "a temporary suspension of visible growth of any plant structure containing a meristem". However, bud dormancy constitutes part of a suite of interconnecting processes characterizing the activity-dormancy developmental cycle that includes in addition to cessation of apical growth, also the bud development, acquisition of cold and desiccation tolerance, seasonal nitrogen cycling and senescence. Consequently, dormancy in buds is not a single state, but rather a range of states that can vary within an individual over the course of the dormancy, between individuals of a species, and also between species. This is the case of peach vegetative and flower buds for which it has been reported that during cold temperature period (to which the dormancy phase is overlapping) a further preformation of leaf primordia and flower whorls differentiation occur, respectively, although at the whole-tree level the plant experiences dormancy as part of the annual cycle of growth. The peach bud scenario is singular in comparison to other fruit species in which organ development during dormancy is almost halted as in sweet cherry, another Prunus

species. With the goal of providing new insights in the understanding of peach buds behavior during the cold season we adopted a strategy in which several omic approaches have been integrated. For flower buds we integrated cytological, epigenetic and chromatin genome-wide data with transcriptional outputs to obtain a complete picture of the main regulatory pathways involved in flower development during chilling accumulation. We uncovered chromatin status that correlates with the transcript levels of the key genes involved in hormone regulation and flower bud developmental progression and concluded that during chilling accumulation flower bud differentiates the inner whorls of flowers so that after chilling fulfillment the male gametes can be produced before the end of winter. A transcriptomic study on vegetative buds during the timepoints corresponding to the study conducted previously on flower buds has been carried out with the goal of comparing the two transcriptomes. To elucidate the connection between the transcriptomic changes that occurs in vegetative and flower buds to the environmental stimuli that the plants seem to perceive to adapt bud development to the cold season is a missing piece in the puzzle of fruit tree dormancy.