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Investigating the epigenetic and transcriptomic effects of strigolactones in Arabidopsis drought memory

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Key message

Strigolactones are needed for full stomatal memory of drought during the recovery phase.

Strigolactones are carotenoid derived phytohormones with well-studied roles in development. In recent years, they were also shown to promote stomata closure by ABA-dependent and independent pathways, and thereby to be important for full acclimation responses to drought. However, their specific role during recovery from water deprivation has not been addressed yet. Recovery is characterised by the so called “stomatal memory” of drought – also called “after-effect” - whereby stomatal conductance does not recover fully even when water potential already has, possibly due to the action of non-hydraulic signal(s) such as abscisic acid.

In this study, we adopted a physiological approach to assess stomatal water loss during a drought time-course and recovery in Arabidopsis strigolactone-related mutants and wt Col-0. Data collected so far show that the stomatal conductance of strigolactone-insensitive mutants, differently from the wt, quickly recover to pre stress levels after drought, suggesting impaired stomatal memory.

Since physiological acclimation often relies on the fine tuning of genetic modulation, we are taking “omics” approaches to understand more in depth the role of strigolactones in recovery to drought. In particular, we are going to investigate the effect of strigolactones in drought-dependent chromatin remodelling/accessibility and gene expression changes via HiC-seq, ATAC-seq and RNA-seq approaches.