

PROJECT TITLE

Adjusting to Variable Environments through sugar and hormone cross-talk

CONSORTIUM

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SUMMARY OF THE REPORT

The aim of the transnational access to the phenotyping facilities at the VIB Ghent were to determine the time of day at which plants grow, and investigate whether carbon responsive GA metabolic genes are involved in adjusting growth to adverse conditions. Previous work identified three gibberellin biosynthetic genes which are responsive to carbon availability and have specific temporal patterns. GA levels were found to follow a pattern of precursor production during the day, and conversion to bioactive GA during the night. Within the transnational access we identified specific growth patterns corresponding to our gibberellin dynamics. Here growth was elevated towards the end of the night. Growth was the lowest in the afternoon, when GA was mostly in the form of precursor rather than the bioactive form. Given GA metabolism was highly responsive to carbon starvation, we hypothesized a role in adjusting growth rates to less favourable conditions. This would prevent the plant from outgrowing its carbon supply. Using the WIWAM platform (<https://www.wiwam.be/>) we were able to accurately assess growth rates of wild type and gibberellin biosynthetic mutants. We found that wild type plants were highly responsive to days with low light availability. Where the gibberellin mutants also responded, the extent of growth suppression was considerably less. Moreover, this growth suppression was pinpointed to the specific days of low light treatment. Overall the phenotyping added a physiological output to the transcriptional and metabolite data gathered in this project, and thus acts very complementary to support our hypothesis of nighttime GA levels determining growth in a carbon dependent way.