

Grow fast, die young: coordination of plant stem elongation and leaf senescence

Supervisory team:

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Host institution: University of Bristol

CASE partner: CN Seeds

Project description:

Sustainably enhancing the quality and shelf-life of fresh produce is a major objective for the horticulture industry. This can be achieved by suppressing excessive stem elongation and delaying senescence-induced chlorophyll breakdown. Stem elongation is promoted by low ratios of red to far-red light and high temperature. Leaf senescence can be triggered by age and abiotic stress such as prolonged darkness during crop transport and storage. The light- and temperature-regulated transcription factors, PHYTOCHROME INTERACTING FACTOR 4 (PIF4) and PIF5 act as master regulators of both stem elongation and leaf senescence.

This project will explore how light and temperature treatments driving stem elongation affect pre- and postharvest leaf senescence in *Arabidopsis thaliana*. The molecular mechanisms underlying these responses will be investigated through analyses of transcriptomic data, mutant and transgenic plants. We will additionally work with UK seed and plant breeding company, CN seeds, to compare the effects of different light and temperature treatments on the postharvest shelf life of salad rocket (*Eruca sativa*) leaves. Rocket homologues of key *Arabidopsis* genes involved in the regulation of leaf senescence will be identified providing targets for modification via breeding and gene editing. As rocket is a close relative of *Arabidopsis*, it is likely that insights made into PIF-mediated development in *Arabidopsis* will be effectively translated into rocket.

Our aim as the SWBio DTP is to support students from a range of backgrounds and circumstances. Where needed, we will work with you to take into consideration reasonable project adaptations (for example to support caring responsibilities, disabilities, other significant personal circumstances) as well as flexible working and part-time study requests, to enable greater access to a PhD. All our supervisors support us with this aim, so please feel comfortable in discussing further with the listed PhD project supervisor to see what is feasible.