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Oral Communication Abstract – 4.04

EXPLORING ROOT PROGRAMMED CELL DEATH AS A MECHANISM FOR HEAT STRESS RESILIENCE

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Programmed Cell Death (PCD), Heat Stress (HS), root, phytohormone

Several plant cell types undergo Programmed Cell Death (PCD) to successfully finalize their development. In Arabidopsis, characteristic PCD events are crucial for the correct development of the lateral root cap, the most external tissue of the root. The lateral root cap translates the environmental stimuli into internal cellular response, thus leading to the regulation of the growth and architecture of the entire organ. In order to ensure tissue proper development and functions, the uppermost cells of this tissue undergoes a characteristic PCD event, as a result of which they are sloughed off the root into the soil. Exploiting a live imaging approach combined with cell type specific gene editing, we show that the dynamics of the auxin phytohormone govern the timing of the uppermost lateral root cap cells PCD occurrence. We found a specific molecular circuit that confers positional cues to lateral root cap cells to coordinate cellular turnover and whole organ development. We also show that this PCD molecular circuit is also a strategy developed by plants to cope with heat stress, by reshaping root architecture for optimal growth response in terms of energy consumption and nutrient absorption.