**Recovery, a new dimension to stress research in plants. A case study of the response of the maize leaf growth zone to a cold spell**

Cold spells, short periods of chilling stress, negatively affect maize (*Zea mays*) plants and thereby limit maize yield in North-Western Europe. Although breeders and agronomists broadly recognize the importance of rapid and full recovery after transient exposure to stress conditions, recovery mechanisms have hardly been studied in plants. We previously established an experimental system to study the effect of cold on different developmental stages of maize leaves, just before leaf emergence (D0 plants) and 3 days after (D3 plants), and to study recovery from this cold stress. We utilized the growth of the maize leaf due to its sensitivity to cold, linear growth and large growth zone. By a kinematic and genome-wide transcriptome analysis, we identified the phytohormone jasmonic acid (JA) and the enzymatic antioxidant peroxidase (POD) as potential key regulators of recovery from cold. This research, therefore, aims (1) Pioneer a novel, high-resolution leaf growth analysis using automatic leaf length tracking for studying stress recovery, (2) Characterize the role of jasmonic acid and peroxidase in cold recovery at the cellular level by kinematic analysis and at the metabolite level by series of biochemical experiments (3) Unravel the molecular mechanisms downstream of JA and POD guiding the recovery response by transcriptomic analysis. This project will set a new paradigm in stress research and lead to the development of resilient maize varieties, crucial for ensuring global food security in a changing climate.

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