BSc. or MSc. internship

Open Canopy: open-source monitoring of whole-canopy water use

Institute: Jan Ingenhousz Institute

Theme: Crop photosynthesis

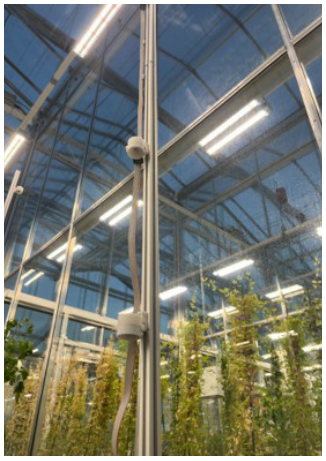
Type of experiment: Sensor development

Location: Radix

Background & aim

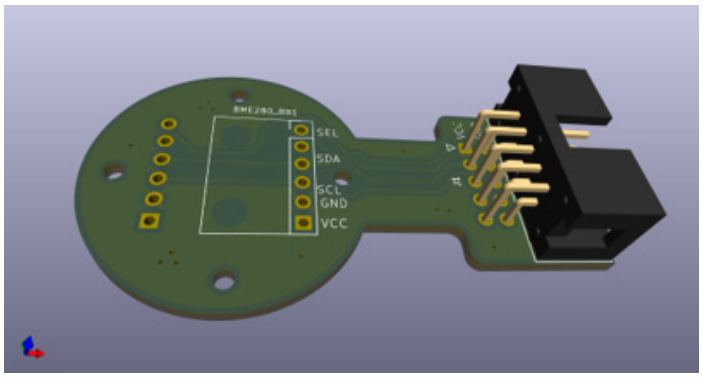
This thesis investigates an open-source, low-cost sensor system designed to monitor water vapour dynamics throughout a plant canopy and evaluate its usefulness for studying whole-canopy transpiration. Plant transpiration is a major component of ecosystem water fluxes and strongly influences climate, energy balance, and crop performance. Traditional methods—such as sap flow sensors, eddy-covariance towers, or commercial gas-exchange systems—provide high-quality data but are expensive, technically demanding, and poorly suited for large-scale screening or fine-scale spatial resolution within the canopy. Recent improvements in inexpensive humidity sensors create an opportunity to measure vertical patterns of water vapour and infer transpiration in a more accessible way.

In this project, you will deploy arrays of sensors the field or greenhouse to collect time-series data related to plant transpiration. The work will test whether the system can distinguish differences in transpiration patterns across genotypes or environmental treatments, and assess its suitability for breeding programs targeting improved water-use efficiency and drought resilience. By advancing open-source microclimate monitoring, this thesis contributes to more scalable, affordable tools for both environmental research and sustainable agricultural management.



Methods

- Electronic design
- 3D printing
- Sensor testing



Jan IngenHousz Institute

The Jan IngenHousz Institute (JII) is an open science research institute dedicated to improving photosynthesis to enhance global crop productivity, sustainability, and climate resilience. JII brings together expertise in engineering, data science, plant biology, biophysics, genetics, and breeding. We develop innovative sensors, research methods, and data analysis platforms that enable collection and interpretation of real-time field measurements of photosynthesis.

Located on the campus of Wageningen University, JII offers a dynamic, interdisciplinary environment where curiosity meets impact. If you're a student eager to apply your knowledge to photosynthetic efficiency challenges, this is your opportunity!

For more information, contact **Ludovico Carracciolo** (ludovico.caracciolo@jii.org)

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