MSc. internship

What do stop grains do to grow bigger?

Institute: Jan Ingenhousz Institute

Theme: Crop Photosynthesis

Type of experiment: Field research

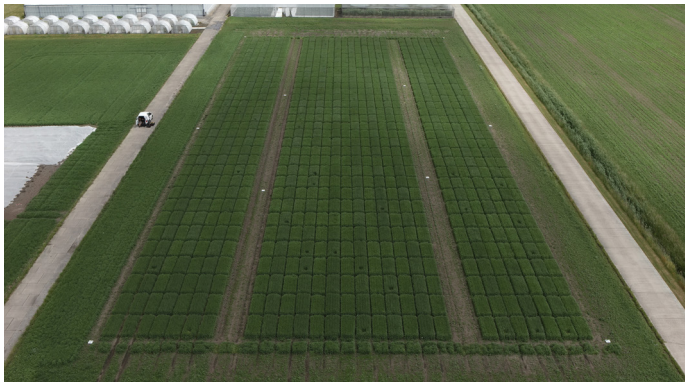
Location: Wageningen

Period: Spring/Summer

Background & aim

Increased photosynthetic efficiency represents a promising frontier for achieving substantial improvements in crop yield and agricultural sustainability. However, the underlying mechanisms that link photosynthesis to yield remain unclear. Grain yield is thought to be limited by the amount of carbohydrates a plant assimilates and is allocated to the grain (source limitation). If so, increased photosynthesis could drive increased yields. Alternatively, grain yield can be limited by the capacity of the grain to grow any bigger (sink limitation), in which case increased photosynthesis will have limited effects on yield. A better understanding of the role of source and sink limitations to grain yield is key for breeding strategies.
The field experiment will be based on simple experimental manipulation of barley spikes to alter grain sink capacity for carbohydrates. Leveraging on, we aim to test the genetic variability on the degree of source/sink limitations to grain yield and its potential effects on photosynthesis.

The aim of this project is to quantify the genetic variability on the degree of source/sink limitations to grain yield and its potential effects on photosynthesis. The field experiment will be based on ongoing Barley breeding trails and simple experimental manipulation of barley spikes to alter grain sink capacity for carbohydrates. Within the project, you have the opportunity to expand on the physiological link between photosynthesis and grain mass, the compensatory effects of grain number and grain mass, and/or genetic variability across genotypes, depending on their own interests.



Tasks

You will conduct field research, lab work, and gain hands-on experience on several techniques used to quantify photosynthesis and other physiological measurements. In collaboration across different groups within the JII, you will be involved in different field experiments to:

- Perform spike manipulation
- Quantify photosynthesis and development
- Characterize carbon partitioning

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!

What you will learn

During this project, you will integrate with the engaging research community in the JII. You will gain extensive hands-on experience in **Plant Physiology** and **Field Research**. You will also develop skills in **data analysis and visualization using R**, and **scientific communication**.

For more information, contact Mauricio Tejera (mauricio.tejera@jii.org)

Jan IngenHousz Institute