

# Identifying genetic variation in photosynthetic traits in heterozygous Bi parental diploid potato populations

## Background & aim

As a step to explore possibilities for photosynthetic improvement in diploid potato, we explore the use of segregating populations, i.e. biparental populations, as a source of natural genetic variation. Our goal is to utilize genomic selection methods to improve photosynthesis and to achieve this, we must first determine whether the observed phenotypic variation can be reliably attributed to specific QTLs, or whether a substantial proportion of the variation remains unexplained. Bi parental populations are developed from crosses between two individual parental lines, which in this case are highly heterozygous diploid potato genotypes. This implies that the resulting population will segregate for various traits including and not limited to photosynthetic traits. A biparental population can be a useful tool for unraveling the genetic basis of various photosynthetic traits as well as plant responses to environmental conditions.

The objective of this research is to quantify the proportion of photosynthetic variation that can be explained by quantitative trait loci (QTL). Extensive data on photosynthetic performance and associated traits will be collected multiple times day and night in a high-throughput system in NPEC. Specifically, this study will first evaluate the extent of natural genetic variation for these traits in the population and then seek to map the loci underlying the observed phenotypic variation.

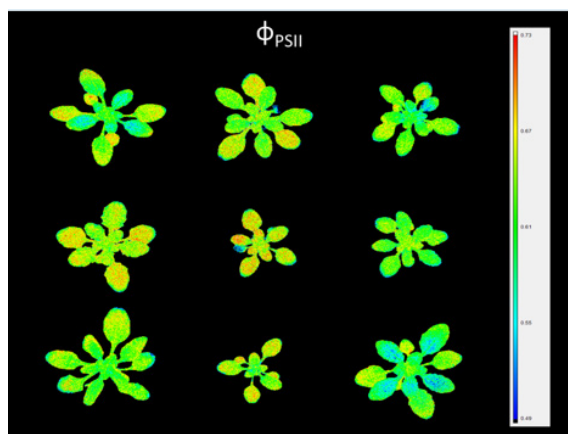
**Institute:** Jan Ingenhousz Institute

**Theme:** Genetics

**Type of experiment:** NPEC

**Location:** Unifarm, Wageningen

**Period:** March – September 2026



Example of Arabidopsis plants in the high-throughput system in NPEC and variation in photosynthesis observed in Arabidopsis genotypes

## 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!

## Useful skills

- Basic statistical skills
- Basic knowledge / experience in Genetics: QTL mapping



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