



# securing tomorrow's resources

## Internship/Thesis project “Understand the genetic control of trade-off between leaf size and anatomy and its physiological implication on carbon assimilation in barley”

Institute for Breeding Research on Agricultural Crops - based in Groß Lüsewitz

### The project

The flag leaf is an important source of assimilates for developing grains in cereals. Hence, leaf traits are highly valued as they can have significant impact on cereals yield. In contrast to maize and rice, understanding of genetic regulation of leaf size in barley is limited. We developed a multi-parent population by crossing 23 diverse barley inbreds following a double-round design (HvDRR). The HvDRR population consists of 45 recombinant inbred line (RIL) families comprising 35 to 146 RILs per family. We employed the HvDRR population to understand the genetic makeup of flag leaf size variation in barley (<https://doi.org/10.1101/2025.04.28.650967>) and identified several quantitative trait loci (QTLs) associated with flag leaf size. The current project aims to understand the effect of flag leaf size associated QTLs on photosynthesis related traits, whole plant morphology to microscopic phenotypes linked with fitness trait in barley.

### Research activities and methods

The activities of the current project involve (but are not limited to)

- Morphological and anatomical characterization of leaves.
- Recording photosynthetic parameters of leaves using MultispeQ and gas exchange analyzer.
- Collection and preparation of leaf samples for evaluating total nitrogen, carbon, and  $\delta^{13}\text{C}$  content.
- Dissection and morphological characterization of immature spike meristems.
- Statistical analyses of the collected data set.

### Qualification and interest

We are looking for candidates with the following qualification and interest:

- Enrolled in a graduate program in biological or agricultural science, biotechnology or related fields.
- Willingness to learn light microscopy and explore different phenotyping methods.
- Interest in plant cultivation and phenotyping in controlled conditions.
- Interest of (or exposed to) data collection, statistical analysis and interpretation.
- Competent in written and spoken English.
- Motivation and good work ethics.

### Our offer

- a research oriented internship/thesis at the Institute for Breeding Research on Agricultural Crops, which is part of the Julius Kühn Institute, the Federal Research Center for Cultivated Plants.
- an international and multi-disciplinary group with expertise on biostatistics, quantitative genetics, plant genomics, molecular genetics, plant breeding, bioinformatics and plant physiology working on current topics of breeding methodology and crop genetics.
- an enabling working environment and friendly colleagues, state-of-the-art plant cultivation facilities, laboratories and an experimental field.
- Our institute can be reached within 17 minutes by train from Rostock central station.

### More information

For further details on project description and application, please contact:

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The Julius Kühn Institute is an institution directly subordinated to the Federal Ministry of Food and Agriculture (BMEL).  
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