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MSc project on “Understanding *SCLP-like* protein and *TCP5* mediated phenotypic plasticity under abiotic stress in barley”

Project description

Terrestrial plants show morphological and physiological plasticity to cope with an unfavorable growing environment. The coordinated actions of gene regulatory networks regulate such adaptive response. One of the example of is *TCP5* gene that controls leaf margin development, flower size and thermos-morphogenesis in dicot model *Arabidopsis*. Another group of the gene under investigation is the ortholog of *Arabidopsis SCLP51* gene. *SCLP* is a large protein family and some members are involved in stress signaling. We have created loss-of-function lines of some members of *TCP5* and *SCLP-like* protein. Our preliminary data showed that *SCLP-like* protein might be involved in root growth and *TCP5* might contribute to determine leaf size in barley. The current project aims at a systematic evaluation of stress-induced morphogenesis in the loss-of-function mutants of *TCP5* and *SCLP-like* genes.

Research activities and methods

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

- Genome-wide identification and distribution of *TCP5* and *SCLP-like* family gene in barley genome,
- Root zone specific expression profiling of *SCLP-like* genes,
- Expression of *TCP5* gene along the margin and the central region of leaf blade, and
- Selection of double mutants for *TCP5* gene family,
- Genotyping and selection of transgene positive lines with constitutive expression of *TCP5* and *SCLP-like* genes, and
- Morphological and physiological phenotyping under water and temperature stress.

We highly encourage and welcome additional inputs on research ideas during the study that will further understanding of the research question.

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.
- Experience (or at least willingness to learn) on laboratory methods such as nucleic acid extraction, PCR, qRT-PCR, biochemical assays, tissue sectioning, microscopy and Sanger sequencing.
- Interest in plant cultivation and phenotyping.
- Interest of (or exposed to) data collection, statistical analysis and interpretation.
- Competent in written and spoken English.
- Motivation and good work ethics.

Our offer

We offer a research oriented MSc 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. At our institute an international and multi-disciplinary group with expertise on biostatistics, quantitative genetics, plant genomics, molecular genetics, plant breeding, bioinformatics and plant physiology works on current topics of breeding methodology and crop genetics. Our institute offers beside 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.

Contact

For further details on project description and application, please contact

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