

## **DESCRIPTION FOR THE GENERAL PUBLIC**

In the nature, variation of plant traits within species is usually observed. This phenomenon is caused by various mechanisms functioning at the molecular level, including action and interaction of plant hormones (phytohormones) that are important for plant physiology and regulation of growth, and affect the plant architecture. The research hypothesis of the project assumes the existence of a crosstalk between regulatory networks of gibberellins, brassinosteroids and strigolactones in early and late stages of plant development and its impact on the final plant architecture, and, as a consequence, on yield. The material for the studies will consist of barley varieties and mutants carrying different genes controlling phytohormone production in plants. In particular, it will be analysed how and to what extent defects in gibberellin synthesis in barley mutants affect other phytohormones' metabolism and whether the defects may be compensated by these hormones in a feedback manner. Observations will be done on plants growing in optimal and drought stress conditions, by classical phenotyping methods, as well as by image phenotyping. Using the latest techniques of molecular biology, the physiology-related gene networks will be studied by analysis of gene expression at transcript and protein levels. The applied approach will allow to gain new knowledge not only about the individual hormones, but above all about their mutual relations during the growth and development of plants, as well as about their qualitative and quantitative changes in stress conditions. The collected knowledge and constructed regulation networks will serve as a basis for the methods of crop plants improvement in the future. The spectrometric measurements of phytohormones will have a methodological impact on other plant studies and will provide original data on the presence of strigolactones in barley.