



Mendel Centre Seminar



# Genetic Engineering of Barley for Enhanced Drought Tolerance

**27/10/2015**

TUESDAY

**start 16:00**

delivered by

Seminar room 252, building A29  
University Campus Bohunice  
Kamenice 5, Brno

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Hosted by doc. RNDr. Jan Hejátko, Ph.D.

## Abstract:

One of the research goals of the Centre is to understand and improve the tolerance to drought. As a tool, genetic manipulation of the level of plant hormones cytokinins that are one of the main plant morphogens involved in many different physiological processes, is exploited. The barley (*Hordeum vulgare*) cultivar Golden Promise was transformed using the cytokinin dehydrogenase 1 gene from *Arabidopsis thaliana* (*AtCKX1*) under the control of mild root-specific  $\beta$ -glucosidase promoter from maize. Increased cytokinin degradation activity was observed and positively affected the number and length of lateral roots. The impact on morphology depended upon the recombinant protein's subcellular compartmentation. While assumed cytosolic and vacuolar targeting of *AtCKX1* had negligible effect on shoot growth, secretion of *AtCKX1* protein to the apoplast had a negative effect on development of the aerial part and yield. Upon the application of severe drought stress in greenhouse conditions, all transgenic genotypes maintained higher water content and showed better growth and yield parameters during revitalization. Transcriptome analysis indicated that the higher tolerance to drought stress was most probably caused by altered root morphology and stronger lignification of root vascular bundles. Agronomical data from first season of field trials will be presented.