



Comparison and modeling of effects of normal and reduced precipitation supply in field experiment with spring barley

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This paper evaluates two-year (2013 and 2014) results of field experiments with spring barley (cultivar Bojos) under reduced precipitation supply. The field experiments were carried out at the experimental station in Domanínec (Czech Republic; 49°31,470'N, 16°14,400'E, altitude 530 m a.s.l.) and conducted by Institute of Agrosystems and bioclimatology at Mendel University in Brno in cooperation with Global Change Research Centre AS CR. The field experiments consisted of small plots in two variants and three repetitions. The first variant was uncovered the second was partially covered to exclude rain through out the whole vegetation season. For the partial covering of the plot, a material which transmits solar radiation and diverts rainwater away from the percentage coverage of the plots was used. In 2013, the covered area of the experimental plot was 30%, and in 2014, it was 70%. The main aim was to determine whether there are any differences in the spring barley's development, growth and yield in the uncovered and the partially covered plots, and a comparison of the results. Firstly, differences of key parameters (seasonal dynamics of the leaf area index and above ground biomass, soil water content, yield components and yields) compared; secondly, the results of the field experiments served as input data for the crop growth model DAISY. Subsequently, the crop growth model' ability to simulate crop growth and crop development which were affected by the drought stress was explored. The results were assessed using the following statistical indexes: root mean square error (RMSE) and mean bias error (MBE). This study was funded by project "Building up a multidisciplinary scientific team focused on drought" No. CZ.1.07/2.3.00/20.0248, NAZV-JPI - project supported by Czech National Agency of Agricultural Research No. QJ1310123 "Crop modelling as a tool for increasing the production potential and food security of the Czech Republic under Climate Change" and project LD13030 supporting ES1106 COST Action.