

## **Abstract**

Drought is the most important factor decreasing yield of cereals, including wheat. Metabolic changes under drought stress are related to alterations in carbohydrates concentrations.

The aim of the study was the identification of quantitative trait *loci* (QTLs), for selected yield components and water soluble carbohydrates in three parts of wheat: flag leaf, peduncle and ear, and also the analysis of the distribution on chromosomes of detected QTLs under drought stress conditions and under optimal irrigation.

Plant material of this work was the mapping population consisting of 94 doubled haploid lines of wheat. The genetic map of the population with a total length of about 4040 cM, contains 920 molecular markers. Plant were grown in the pots at the vegetation tunnel, protected against rain, in 2010-2013. Plant growth took place in conditions similar to the natural within the period of spring to autumn (V-IX). Limited irrigation was maintained for 4 weeks starting for the plants in the tillering stage (years: 2010, 2011 and 2012) and at the stage of shooting (2013). Estimated yield components were: number and weight of grains per plant and biomass. At the last day of drought treatment flag leaves, peduncles and ears were sampled to determine the water soluble carbohydrates concentrations. QTL analyzes were conducted using the Windows QTLCartographer Single Marker Analysis and Composite Interval Mapping methods.

For 19 traits, 77 regions were located on all of the chromosomes of *T. aestivum* L. The most important linkage groups for yield components and water soluble carbohydrates were chromosomes: 1A, 1B, 1D, 2A, 2B, 2D, 3B, 4A, 5A, 5B, 5D, 6A, 6B, 7A and 7B, among which the most QTLs were detected on chromosomes: 6B, 7B and 5A. Identification of regions of wheat genome with QTLs, led to point out molecular markers most strongly linked to quantitative traits. Common and stable QTLs for yield components and water soluble carbohydrates are the evidence for genetic relationships of analyzed traits.