

Evaluation of transcription activity of two dehydrine genes Wcs120 and Wdhn13 in the wheat varieties with different level of frost tolerance

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Transcription activity of genes Wcs120 and Wdhn13 was evaluated by Real-Time RT-PCR in five wheat varieties (one spring and four winter ones) with different level of frost tolerance expressed by LT50 in conditions of cold hardening. We tried to verify if the activity of these genes is higher in winter tolerant genotypes than in spring ones during cold hardening, and to test, if it is possible to observed this relation also in winter varieties with less differences of their frost tolerance commonly.

The transcription activity of Wdhn13 gene was evaluated in the four winter varieties Mironovska 808, Samanta, Rialto, Trend and spring variety Sandra. The varieties were chosen in accordance with their published LT50. Two weeks old seedlings were exposed to cold hardening at 3°C. After 0, 1, 4, and 7 days of cold hardening the young leaf samples were sampled collected for RNA analysis.

Differences in level of transcription activity among these tested varieties were

detected, mainly in the incipient phase of cold hardening (1day of 3°C). The highest activity was found in the variety Mironovska 808 and the lowest in the spring Sandra. Differences among the level of transcription activity of other tested winter varieties closely corresponded to their presented LT50.

In other series of the experiments, the spring wheat Sandra and the winter wheats Bill, Zdar, Šárka, and Mironovskaya 808 were investigated with regard to their differing ability to develop a frost tolerance. The low frost tolerant cultivar (spring wheat Sandra), medium frost tolerant cultivars (winter cultivar Bill and Zdar) and highly frost tolerant cultivars (winter cultivar Mironovskaya 808 and Šárka) were distinguished by the Western analysis using dehydrin or WCS120 antibody. The accumulation of WCS120 proteins shows the possibility to distinguish also the non-acclimated (cultivated at 17 °C) low and high frost-tolerant cultivars.

Transcription activity of WCS120 was evaluated in the non acclimated plant (cul-

tivated at 25°C and 17°C) with very low level of the specific proteins. Low activity of this gene was detected even in the plants from optimal temperature conditions (25°C), but only in winter cultivars. Activity of Wcs120 increased in all tested genotypes winter one and spring one cultivated at 17°C and its level was related to level of frost tolerance of the tested cultivars.

Expression of genes Wcs120 and Wdhn13 evaluated on transcription and translation levels was related to level of frost tolerance of the tested cultivars. It appears, that both types of evaluation could be used for evaluation of level of frost tolerance of the wheat cultivars.

The presented results were found only in five, even if different varieties so far and these knowledges will be studied in detail.

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