

SOMATIC TISSUE CULTURE OF SPRING WHEAT GENOTYPES: STUDIES ON THE USE OF FIELD GROWN PLANT MATERIAL

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Tissue culture response is known to be highly genotype dependent in both the somatic and haploid *in vitro* systems. For genetic transformation and other techniques based on somatic embryogenesis immature zygotic embryos proved to be the best plant material. Although, to achieve the highest regeneration rate plant material of greenhouse origin is preferred, field grown donor plants can also have a seasonal importance.

We studied the tissue culture response of three spring wheat genotypes which are regularly (CY-45, Bobwhite) or occasionally (GK Tavaszi) used in genetic transformation experiments. The culture protocol applied had been originally developed through studies on biolistic gene transfer into immature embryos of wheat. Suitability of plant material of field origin was tested here by using immature embryos of different sizes to compare their regeneration capacity as well. In the case of CY-45, the genotype used in our genetic transformation experiments, the induction frequency of embryogenic structures was higher if immature embryos of greenhouse origin were applied. In contrast to earlier results, embryos of the size >1.5 mm gave better result (84%) compared to those of the size 0.5-1.5 mm (57%). The same tendency was detected for tissue culture response values.

In the experiment performed with immature embryos of various sizes (0.5-2 mm) CY-45 exhibited higher induction rate of embryoid structures compared to Bobwhite (43% and 27%, respectively). However, this value for CY-45 was lower compared to earlier results (43% vs. 93%). This can be explained by the differences in the culture protocol among others by the osmotic treatment applied here as an essential part of the biolistic gene transfer protocol. Other explanation can be the poor quality of plant material caused by the extremely dry weather during anthesis in the current year (2007).

If immature embryos were selected by their size the cultivar GK Tavaszi gave the best results. The average tissue culture response of the three genotypes was 80% for embryos of 0.5-1.5 mm and 90% for those of >1.5 mm and the average induction frequency of embryogenic structures was 30% and 21%, respectively. Latter values are by far below the average reported earlier on experiments using plant material of field origin.

We can conclude that climatic conditions had a strong influence on the suitability of field grown plants for *in vitro* usage: anomalies in precipitation and temperature during anthesis resulted in poor tissue culture response even if the size and morphology of the immature embryos seemed to be normal. This feature could be observed at both the introduced CIMMYT lines (CY-45, Bobwhite) and at the established cultivar bred under the climatic conditions of Hungary (GK Tavaszi), however to less extent at the latter one. Our results suggest that for genetic transformation and other somatic embryogenesis-based techniques

- the usage of plant material of greenhouse origin is recommended for the genotypes CY-45 and Bobwhite, while
- in the case of GK Tavaszi field grown donor plants can also be used assuming no extremities in weather conditions.

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