

Effect of stress factors and media composition on the appearance of albinism within androgenic rye regenerants

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Regeneration of rye plants has been described for different tissues and organs. The process of androgenesis allows to obtain doubled haploids (DH) – completely homozygous lines in a short time. They are widely used in plant breeding and basic research. Since the 1970s the aim of researchers was to develop an efficient method of rye doubled haploids production. It seems that our understanding of the rye androgenesis process is still questionable. Despite good results in some laboratories and for some genotypes, anther culture response of rye remains unpredictable. Production of DH plants that could be used for molecular research and breeding for particular characteristics depends on success in anther culture, survival rate of green plants, fertility of regenerants and last but not least frequency of occurrence of albinism among germinating regenerants.

The goal of presented study was to analyze how a certain stress and induction medium composition can reduce the number of anther culture regenerants lacking chlorophyll. For individual genotypes we observed greater effect of the stress combination on the number of regenerating albino plants than the induction medium variant. Among all tested combinations, the lowest level of albinism was observed for cooling shoots, with spikes for a period of 21 days. For two genotypes and 619 plants regenerated, we did not record any plant without chlorophyll. It should be noted that this type of stress has led to obtaining of high efficiency regeneration, where the best genotype of the average number of regenerated green plants was 37 per 100 plated anthers.

We observed that the use of high temperatures during the reprogramming of microspores was reflected in the increased number of regenerated albino plants. No significant effect of the composition of induction medium on the number of acquired plants without chlorophyll was observed.