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ESTABLISHMENT OF A HIGH EFFICIENCY ANTHER CULTURE SYSTEM IN WINTER WHEAT

Anther culture plays important roles in the breeding, construction of doubled haploid (DH) genetic population, mutagenesis and transgenic researches. DH increases efficiency of selection of mutants and accelerate development of varieties. Five characters of anther culture of six winter wheat genotypes were identified through the vernalization, generation acceleration in greenhouse, using anther culture method in spring wheat established by Broughton. We aimed to investigate whether the anther culture method can be applied for the isolated haploid culture of winter wheat (to be reconsidered: is it anther culture of haploid plants, which normally do not bear normal gametes or anther culture to develop haploid plants?). The effects of low temperature pre-treatment for 3-15 days before inoculation were studied. Results showed that the tested parameters showed significant differences among different genotypes. Six winter wheat genotypes exhibited better initiating rate and differentiation ability of green plantlets. The callus induction rate, green plantlets differentiation rate, and green plantlets productivity rate were 116.5%, 5.8% and 10.3%, respectively, indicating a preliminary establishment of an anther liquid floating separation system for winter wheat genotypes. The young seedling of two genotypes showed reduced callus induction rate and green seedling yield, as well as increased albino seedling after pre-treatment at low temperature. Although the green seedling yield rate in the low temperature groups was lower than that in the control, a certain amount of green seedling was also obtained. Therefore, if the collected samples cannot be used for inoculation immediately, the spikes may be stored at 4°C. In summary, the anther culture method in spring wheat can also be used for winter wheat by the combination of vernalization with generation-adding technique in greenhouse. The optimized procedure expected to contribute to mutation breeding in wheat.

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