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Genetic effects of alien chromosome substitution or translocation in common wheat

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The polyploid nature of *Triticum aestivum* L. has opened up opportunities for the development of cytogenetic studies that allow targeted intervarietal and alien substitutions of chromosomes or their fragments and to study the effects of these chromosomes on the manifestation of a complex of characters. Genetic models, including substitution and translocation lines, introgressive lines and synthetic wheat with the participation of species of the Triticeae tribe contribute to the enrichment of the common wheat gene pool and play an important role in the selection for resistance to biotic and abiotic stresses. The aim of the work is to study the directed processes of transformation of the genome of common wheat as a result of intergenomic substitutions of chromosomes or their segments with chromosomes of taxonomically distant cereal species (*Ag. elongatum*, *Ag. intermedium, S. cereale*, *H. marinum*), to study the contribution of alien chromosomes to the formation of adaptive and agronomic traits. A set of ditelosomic wheat-barley substitution lines (*T. aestivum–H. marinum*) on chromosomes of the homeological group 7 was obtained. It has been shown that 7HIL^{mar} chromosome of *H. marinum* was homoeologous to the group 7 chromosomes of common wheat. Wheat-rye 5R(5A) substitution lines for winter wheat varieties Ulyanovka and Filatovka were created. Field experiments conducted in the winter of 2017/2018 showed that these wheat-rye lines overwinter by 90–100 %, but at the same time they have facultative type of development and can grow out during spring sowing. Was isolated homozygous forms with a combination of genes controlling disease resistance (*Lr26/Pm8/Sr31 + Lr19/Sr25 + Lr6Ai Sr6Ai/Pm6Ai*), different color of grain (*Ba1* and *Pp-1/Pp3*) and winter type of development (*vrn-R1*) based on phenotypic markers and molecular analysis by PCR with specific primers. Phenotyping and genotyping of introgression lines for disease resistance in a field experiment was carried out and plants resistant to leaf rust were selected.

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