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人类和医学遗传学

GENETIC ANALYSIS OF TOLERANCE TO LEAF RUST OF LINES DERIVED VIA CROSSING HEXAPLOID AND TETRAPLOID WHEAT

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Abstract: Tetraploid endemic species *Triticum timopheevii* Zhuk. (genomic formula A^1A^1GG) is characterized by a unique pool of genes, controlling resistance to various wheat diseases. Creation and intensive involving into selection process of soft wheat donors with effective resistance Lr genes, transferred from wild relatives, could significantly expand its genetic basis on one or the other economically valuable traits. However, despite some difficulties (the sterility of hybrids and cytological instability), the literature contains information on transferring a number of genes, determining resistance to leaf rust, stem rust and powdery mildew from *T. timopheevii* to soft wheat.

Current research focuses on genetic analysis of resistance to leaf rust of introgression lines, derived from a complex hybridization of common wheat variety of Kazakhstanskaya-3 (*T. aestivum*, 2n = 42) with *T. timopheevi* (2n = 28) and subsequent two-fold saturating crossing. Lines 344 and 345 (L-344 and L-345), resistant to brown, yellow and stem rust, and also marked by good quality of grain, were picked out of hybrid offspring by repeated selection later.

Resistance of L-344 and L-345 to leaf rust was identified by tester isogenic lines of Thatcher variety with effective genes Lr9, Lr19, Lr23, L 24, Lr26 and Lr29. A necessary condition for the identification of disease resistance genes in donors is to determine their chromosomal localization.

As a result of the monosomic analysis of F_2 population segregation in line 5A for 179 resistant and 14 susceptible plants showed significant deviation of the chi - square value (χ^2=32.58) by theoretically expected 3:1, detected in control hybrid (χ^2=0.19). Combinations obtained upon crossing 21 monosomic lines with L-345 gave strong deviation from control hybrid (χ^2=0.34), noted in chromosomes 2B (χ^2=19.85) and 4B (χ^2=11.08), which corresponded to digenic inheritance. All these data suggest the localization of leaf rust resistance genes for L-344 in chromosome 5A, and for L-345 in chromosomes 2B and 4B, correspondingly.

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