Current State of the Genetic Polymorphism in Spring Barley (*Hordeum vulgare* L.) from Russia Assessed by the Alleles of Hordein-Coding Loci

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Abstract—Starch gel electrophoresis was performed to study the polymorphism of hordeins encoded by the *Hrd A*, *Hrd B*, and *Hrd F* loci in 211 varieties of spring barley. For 41 of these varieties, the genetic formulas were established for the first time. In the two samples of varieties, the comparative analysis of allelic diversity and allele frequencies of hordein-coding loci was carried out. The first sample consisted of 101 spring barley varieties approved for the use on the territory of the Russian Federation in 1999, while the second sample included 160 spring barley varieties that were approved in 2014; 49 of these varieties were common for both samples. It is demonstrated that the current tendency to reduction of the proportion of heterogeneous spring barley varieties is mainly due to the introduction of foreign varieties homogeneous for the hordein-coding loci. At the same time, there is an increase in polymorphism of hordein-coding loci in modern spring barley varieties. The number of alleles for the *Hrd A* locus increased by five alleles, and for the *Hrd B* locus, by nine alleles. Along with the alleles recorded earlier in barley landrace populations and varieties bred in 20th century, three novel alleles of the *Hrd A* locus and four alleles of the *Hrd B* locus were identified. The number of alleles of the *Hrd F* locus remained unchanged (four), and the changes in their frequencies were small. At the same time, the changes in frequency observed for some alleles of the *Hrd A* and *Hrd B* loci were statistically significant. All newly identified alleles of hordein-coding loci were found with low frequencies (from 0.003 to 0.006), so despite the increased number of alleles, no statistically significant increase in genetic diversity in terms of μ and *PIC* indices was observed.

Keywords: spring barley, hordein electrophoresis, hordein-coding loci, identification of varieties, genetic diversity

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