

Annotation

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Diallel analysis of the genetic control of spike length in spring barley modern varieties

The genus *Hordeum* L. is characterized with one-flowered spikelet in spike. In this regard, grain number per spike is closely related to its length. The available literature contain ambiguous data on the genetic control of this trait which may be due to various genetic material involved in crossing and growing conditions of hybrids as well. Therefore, research on the breeding and genetic characteristics of spring barley by main spike length in specific environmental conditions is of practical importance for the crop breeding.

The purpose of the research is to identify breeding and genetic characteristics of modern varieties of spring barley concerning to "the main spike length" and to identify genetic sources of enhanced combining ability.

The researches were carried out at the V.M. Remeslo Myronivka Institute of Wheat of NAAS. According to the complete diallel scheme (7 x 7), modern domestic varieties (Virazh, Talisman Myronivskiy, Komandor) and foreign ones (KWS Aliciana, KWS Bambina, Zhana, Explorer) were crossed. The parent components and F_1 were examined in the field in 2014-2016.

The analysis of variance has attested to reliable values of both general (GCA) and specific combining ability (SCA), but with a significant advantage of GCA. Reciprocal effect was noted only in 2014. Reliable positive effects during all the years of research were noted for varieties Virazh (0.36-0.53), KWS Aliciana (0.33-0.49), KWS Bambina (0.23-0.44). In genetic control an additive-dominant system has been identified. Non-allelic interaction was not observed. In 2014 the additive effects prevailed, and in 2015-2016 the dominant ones did. The average degree of dominance (H_1/D) indicated dominance in 2014 and overdominance in 2015-2016. The same pattern was characteristic also for the indices of average degree of dominance in the loci ($\sqrt{H_1/D}$). Domination was reliably aimed at increasing the trait. At least 4 genes (blocks of genes) were detected that exhibited effects of domination. The index of relative frequency of distribution of dominant and recessive alleles ($F < 0$) varied over the years: in 2014 recessive genes (effects) slightly exceeded, in 2015 dominant ones did, and in 2016 almost uniform distribution of dominant and recessive alleles between the parent components was observed. High values of the heritability coefficient in a broad sense ($H^2 = 0.96-0.98$) attest to significant conditionality of phenotypic variability by genetic factors, and high values of the heritability coefficient in a narrow sense ($h^2 = 0.61-0.65$) do to the contribution of additive effects of genes.

Significant contribution of additive effects of genes and indices of coefficients heritability give grounds to predict the efficiency of selections for increase of the trait in hybrid material developed. At the same time, the prevalence of dominant effects in most years causes the necessity of sufficient sample of material and the rationality of carrying out a "hard" selection for the phenotype in later generations.

As effective sources for increasing the spike length in combination breeding the varieties Virazh, KWS Aliciana, KWS Bambina should be used.

Key words: spring barley, variety, main spike length, diallel crosses, combining ability, genetic parameters, genetic sources