Annotation

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Productivity and adaptive capacity of maize hybrids, depending on the genotype of the maternal component

Maize is one of the major grain and forage crops. Production leaders are the USA and China, while Ukraine in the list of global manufacturers takes the seventh place, ahead of Mexico and France

Productivity of plants is one of the most important criteria of evaluating cultivated hybrids. Half of the harvest is the result of a properly conducted breeding work, while the other part is agreed on the terms of cultivation and agrotechnical activities to care for crops

The most common method of obtaining hybrid seeds of maize is the use of manual castration of plants, but it is a high cost of production. Now to reduce the cost of seed production of heterosis hybrids, maternal line with various forms of cytoplasmic sterility is used, which are the most studied variants of the genetic system of controlled breeding (GSCB) of a maize.

Special attention deserves GSCB on the basis of genes Vg – (Vestigial glume) of functional sterility (developed in accordance with the patents of Ukraine — 40276 A, 40277 A, 40278 A), which causes changes in generative organs without violations of the genetic mechanisms of microsporo- and macrosporogametogenesis and genes ms5 and ms13 of nuclear sterility. To simplify the control of seed hybridity and reduce the cost of production while applying different GSCB is the use of marker genes of coloring maize grains (control of hybridity according to the phenotype) [7, 8]. Therefore, clarifying of the influence of genetic markers in the various systems of breeding for valuable traits and adaptive capacity of heterotic hybrids of maize in different agroecological growing conditions is an urgent task.

Testing hybrids were conducted in different soil and climatic conditions on the experimental plots of Uman National University of Horticulture under the agroclimatic conditions of the right Bank Forest-Steppe and Brylivka research station under the conditions of the southern Steppe of Ukraine.

The materials of the research were the combinations of simple hybrid Pioneer-Grand 3978 and three-way cross hybrid Grand-6.

The main of the indicators of the value of the created maize hybrid is the level of productivity. In our studies over the years of testing, the hybrids had a significant difference according to this characteristics. However, a significant influence on the grown materials were exactly the weather conditions of areas of the research.

It was found out that among the studied hybrid combinations, the highest grain productivity in the average and over the years of conducting research provided a combination ПЗзМАСR×П5МВР-RR.

Under agroclimatic conditions of Forest-Steppe and Steppe it was determined that the moisture of grains at harvest in hybrid forms increased relatively to the control. However, under the agroclimatic conditions of the Steppe it did not exceed the baseline rates. It was discovered that when the genotypes of the parental components had the Moldavian type of sterility of the genetic markers a1, moisture of grains at harvest was increased regardless of the growing conditions that may indicate the genetic control of this trait. But hybrid combinations of the genotype of the maternal line markers ACR, and the parental – CI is characterized by a tendency to rapid loss of moisture in the grain.

Based on a comprehensive study of the reaction of the hybrid combinations on terms of growing with their assessing the adaptive capacity and stability of the genotype, it was defined that the presence of the dominant genetic markers ACR in the genotype of the parent component in the combination of a simple hybrid contributed to obtaining stable high yields during changes in weather conditions, but the same genetic markers in analogue three-way cross hybrid Grand-6

led to increased sensitivity of the hybrid to the growing conditions.

According to the results of the conducted researches, different genetic systems of controlled breeding with the genetic markers a1, a2 and ACR can be used without fears of their impact on the level of productivity.

Key words: *hybrid, гібридна комбінація, genetic marker, P - and M -type of sterility, maintainer line. fertility restorer.*