

Annotation

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Productivity and adaptive capacity of maize hybrids under different soil-climatic conditions

Maize is an important grain and forage crop that is grown in Ukraine and far beyond its borders. Due to its high drought resistance, maize is a stable crop among spring and winter crops. The genetic potential of its hybrids is a crucial factor in the realization of characteristics and properties that are inherent to the model of a high-yielding hybrid. It is determined by the genotype resistance to diseases and pest damage, as well as to fluctuations in weather conditions of the cultivation. However, the lack of adaptability of genotypes of many high intense hybrids leads to instability of their yields in terms of global warming. Thus, the use of high quality planting material adapted to specific weather conditions can provide a yield increase from 10 to 50 %. However, at the beginning of the XXI century this effect was achieved due to thickening crops. Therefore, the problem of improving production of heterotic hybrid corn seeds with a stable productivity and fast moisture loss and resistance to stressful environmental conditions at the present time is relevant.

As a result of a sudden change to climatic conditions (warming during the past one and a half century occurred on average 0.3-0.6°C), the range of hybrids for the economy should be quite wide. In other words, it requires samples of intensive type which give the opportunity to obtain the maximum yield on irrigated lands; samples of a medium post-yield type receiving medium stable yield under changeable weather conditions of cultivation; samples of highly post-yield type. It guarantees obtaining high yields under adverse soil and climatic conditions of the cultivation (including not irrigated lands).

However, it is necessary to identify genotypes according to adaptation indicators under specific conditions of their further cultivation with the complete use of bioclimatic resources of the region based on actual and not the potential yield for implementing new high-yielding corn hybrids into production.

Coisogenic analogues of the hybrid Pioneer-Grand 3978 with the presence of genotypes of the maternal components of genetic markers a1 and a2 are studied. The possibility of using these markers for maize seed selection, without fears concerning reducing the yield potential of hybrid seeds is proved. The results of studying the adaptive capacity of analogues under the conditions of Right-Bank Forest-Steppe (on the experimental field of Uman National University of Horticulture) and southern Steppe (Briliov Experimental Station) are presented.

Significant fluctuations in weather conditions during the years of experiments differently affected the seed yield of coisogenic analogues of the hybrid Pioneer-Grand 3978. Analyzing the data of the analogues yields, we can note the significant dependence of their yields on the bioclimatic conditions in the area of cultivation rather than the genotype.

The results of these studies give reason to use different ГCKP with the genetic markers a1 and a2 which control the coloration of seeds without concern of decreasing productivity.

It is found that analogues on the fertile basis with genes fixing agents of the C-type of sterility with the genetic marker a2 will provide the guaranteed yield under adverse soil and climatic growing conditions, whereas the hybrid form of the M-type of sterility in the presence of both parental components of the genetic marker a1 more significantly responds to changing growing conditions.

Key words: hybrid, coisogenic analogue, genetic marker, M- and P-types of sterility, fertility fixing agent, variation coefficient.