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RATING DISTRIBUTION OF SPRING BARLEY BREEDING LINES FOR ADAPTIVITY

The research was conducted in the years 2015–2017 on the fields of the grain and forage crops breeding laboratory in the conditions of breeding and seed crop rotation of the Institute of Agriculture of Carpathian Region of NAAS. The subject of research was 10 breeding lines of spring barley and the standard varieties of Komandor and Knyazhy.

The purpose of our work was to determine the parameters of ecological plasticity and stability of spring barley breeding lines on the trait of "yield" and to carry out the rating distribution of the lines according to a complex indicator that takes into account adaptive and productive features of genotypes.

Plasticity (b_i), stability (S_i^2) genotype effect, varietal stability to stress, genotype flexibility, coefficient of variation (V), homeostatic (Hom), breeding value (Sc) were determined for the trait of grain yield. Statistical processing of experimental data was performed using the Microsoft Excel program with the definition of averages, minimum (min), maximal (max) and variation scope (R). Mathematical processing of yield data was carried out by the dispersive method.

To define the integrated parameter, which would include such basic parameters as yield and ability to maintain its level in different conditions, the rating of variety adaptability (RVA) was calculated. In order to rank the lines (Z) within the group, nonparametric statistics were used.

An analysis of the yield of promising barley genotypes was conducted for the determination of adaptive features in the preliminary and competitive testing for 2015–2017. The highest yield was demonstrated by breeding lines 702-1-12 (4,63 t/ha), 409-1-4 (4,06 t/ha) and 545-5-9 (4,04 t/ha). The maximum indicators of the genotype effect also provided these lines, respectively 0,77; 0,22 and 0,18 t/ha.

The highest levels of stress resistance were found in the genotypes of barley 700-311 (-1,13), 699-218 (-0,92) and v. Komandor and 702-1-12 (-0,91 t/ha). The best genotype flexibility, that is, the degree of correspondence between the genotype and environmental factors, were lines 700-311, 702-1-12 and 409-1-4, respectively 6,52; 4,53 and 4,30 t/ha.

High plasticity, that is wide ecological adaptability, distinguished variety-samples with a coefficient of regression from 1,06 to 1,19. In this

category came the breeding lines 702-1-12, 409-1-4, which, according to the results of the calculations, are genotypes of the intensive type with an increased reaction on improving the growing conditions. Lines 545-5-9, 538-2-6, 699-218, 700-3-17, 704-2-110 and the varieties Komandor and Knyazhy with a regression coefficient from 0,95 to 1,04 are genotypes with an average level ecological plasticity. The genotypes with S_i^2 values close to zero (Komandor, 291-9-4, 699-218), that were with low and average plasticity distinguished by high yield stability.

The high level of productivity homeostatic was marked by lines 702-1-12 (14,16), 409-1-4 (12,01), 545-5-9 (11,92), v. Komandor (11,95). Low homeostaticity was found in the lines 703-111 (9,93), 291-9-4 (10,23), 700-311 (10,46), which also yielded lower grain yield.

The breeding value is a complex indicator, which combines yield with the level of adaptive capacity of the genotype. In our studies, the highest breeding value was allocated lines 702-1-2 (3,79), 538-2-6 (3,51), 545-5-9 (3,43), v. Knyazhy (3,72).

The rating of adaptation of spring barley breeding lines was almost the same as the average rank, indicating a lower impact of productivity on it. The best genotypes on the rating of adaptability (702-1-12, 545-5-9, v. Komandor, 409-1-4) were also better for average rank.