Annotation

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Characteristics of sterility maintainer lines in terms of sodium content in roots in breeding high quality CMS hybrids of sugar beet (Beta vulgaris L.)

The main challenge for breeders is the creation of high-technological CMS hybrids of sugar beet. This can be achieved by the significant improving technological quality of roots, which positively affects the sugar yield. Breeding materials significantly differ by components of technological quality of root crops, in particular, sodium content. This difference is conditioned by genotype; therefore breeding methods, specifically, selection of the best lines containing small amount of sodium for subsequent hybridization. To study the variability of the sodium ion content character in sterility maintainers, to define the correlation between this character and sugar content in roots and to select possible sources of low sodium ion content for using in the hybridization breeding program aimed at adaptability and improved technological quality of feedstock. Genetic and statistical analyses of the genotypic variability of agronomic traits in sterility maintainer lines, regression analysis of the sodium content and sugar content characters on the linear level, selection for the desirable character. Source material: five sterility maintainer lines of Uladovo-Liulynetska Research Breeding Station originating from local sugarbeet populations. The sodium ion content in the sterility maintainer lines was determined by genotype and ranged between 1.20 and 1.71 mg/equivalent per 100 g of fresh mass. The variation coefficients of Ot 1, Ot 3 and Ot 4 lines were high, which indicates the effectiveness of inter-line selection. Selection groups with improved agronomic characteristics as compared with the average value of source lines have been produced. The regression interdependence model for the characters of sodium and sugar content is investigated and average negative correlation coefficients between the characters (r = - 0.58 and r = -0.45, for Ot 1 and Ot 4, respectively) are determined. Comparative characteristics of the regression curve for the selected sterility maintainer lines as potential sources of low sodium content was performed. Lines Ot 1 and Ot 4 with low sodium content were selected. They will be involved in the diallel crossings as a source of improved characters. Selection groups for all O-type lines having significantly reduced their potassium, sodium and α-amino nitrogen content (that are the constituents of root technological quality) are created. Revealed is the medium negative correlation interdependence of the potassium and sugar content characters of roots that are a genetic feature of the Uladovo-Liulynetska RBS's materials.

Keywords*: sterility maintainers, sodium ion content, sugar content, variation coefficient, selection group, correlation coefficient.*