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Genetic Analysis of Grain Yield and Starch Content in Nine Maize Populations

Zvonimir ZDUNIC[1], Anto MIJIC[1], Krunoslav DUGALIC[1], Domagoj SIMIC[1], Josip BRKIC[1], Ana MARJANOVIC-JEROMELA[2]

[1]Agricultural Institute Osijek, Juzno predgradje 17, HR-31103, Osijek, CROATIA

[2]Institute of Field and Vegetable Crops, Maksima Gorkog 30, 21000 Novi Sad, SERBIA

Abstract: The objective of this study was to estimate main genetic effects including digenic non-allelic epistasis for yield and starch content in grain by generation mean analysis performed in 9 maize populations (biparental crosses) and their subsequent 6 generations (2 parental, F1 and F2, and 2 backcrosses). The estimated additive-dominance model of inheritance was, due to epistasis, only partially successful in explaining inheritance model for investigated traits and crosses. The additive-dominance model was adequate at 6 crosses for grain yield and 3 crosses for starch content. A digenic epistatic model was sufficient to explain the inheritance model at 6 crosses for grain starch content. The obtained estimations of genetic effects showed varying importance of genetic effects among the investigated crosses and traits. Due to heterosis, the dominance effects appeared to be prevailing in most crosses for yield. These results indicate that adequacy of certain models of inheritance as well as importance of genetic effects for certain traits was dependant upon the particular cross, stressing the importance of the selection of parental genotypes for the success of breeding programmes.

Key Words: Maize, quantitative traits, generation mean analysis, genetic effects

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