

COMBINING ABILITY AND HETEROISIS OF POPCORN FOR PHYSIOLOGICAL SEED QUALITY

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The failure to obtain the ideal stand is one of the causes of decreased crop yields, in this sense it is important to investigate the genetic effects related to seed quality. Popcorn breeding programs in Brazil have emerged but despite some advances there is still a lack of material performance studies specially regard to seed quality. This research was carried out to measure the general combining ability, the specific combining ability and the heterosis for popcorn physiological seed quality. Five popcorn genotypes (PAPA, POP 3, CMS 42, CMS 43 and RS 40) were crossed using a complete diallel mating design without reciprocals in full of 10 hybrid combinations. Seed quality was measured by germination tests and by vigor test. Estimates of general combining ability (GCA), specific combining ability (SCA) and heterosis were obtained by multivariate analysis diallel. High GCA estimates indicate a high-frequency flow of genes from parents to hybrids and the presence of predominantly additive genes. Therefore, the choice of parents should be based in genotypes with a high GCA, which have greater chances of success to get superior hybrids. The parents CMS 42 and CMS 43 showed high GCA values according to multivariate analysis, indicating a tendency to increase of the characteristics assessed. This approach enhances the use of crosses involving the parents CMS 43 and CMS 42 because they showed high GCA effects. Similarly, the combination CMS 42 x 43 CMS also had the highest germination observed (99%) and values of germination speed index (5.99), and positive values for SCA (CP1: 2.18) and heterosis (51.72%). Additionally, the hybrids PAPA x POP 3, POP 3 x CMS 42, POP 3 x CMS 43 and CMS 43 x RS 40 should also be highlighted.

Key words: vigor; germination; germination speed index.